



Brian Schweitzer, Governor

Airport Business Park • 1371 Rimtop Dr. • Billings, MT 59105-1978 • Website: [www.deq.mt.gov](http://www.deq.mt.gov)

### Opencut Mining Program

August 25, 2008

**Subject: TMC Inc., Application to amend the Nuss-Rock Gravel Pit open gravel operation near Gallatin Gateway**

To all interested parties:

Threeway Mining Company, Incorporated (TMC, Inc.) has submitted an Opencut Application to the Montana Department of Environmental Quality (DEQ). TMC, Inc. has applied to amend the Nuss-Rock gravel pit located in Gallatin County, about  $\frac{3}{4}$  mile west of Gallatin Gateway. Access is from Gallatin County's Cottontail Road.

The July 12, 2007 Amendment Application requests an increase in acreage to a total of 87 acres. The application area includes the NE $\frac{1}{4}$  of Section 9 and the NW $\frac{1}{4}$  of Section 10, T3S, R4E. Normal hours of operation would be from 7 a.m. to 6 p.m. Monday through Friday, and 7 a.m. to 6 p.m. on Saturdays for hauling and maintenance. Mining and processing would not be allowed on Saturdays. Equipment maintenance would be scheduled on Saturdays for safety reasons. Hauling or moving existing stockpiles could be done on Saturdays. Major equipment would include a crusher, wash plant, and asphalt plant.

Final reclamation in the year 2020 would include two ponds and surrounding grasslands. The reclamation bond is currently \$126,781.00.

Application materials are available for review at the Billings or Helena DEQ offices.

The Draft Environmental Assessment (EA) attached to this letter identifies and analyzes impacts of the expanded project. It has been mailed to all parties that have shown an interest in the project, including interested local residents, the Gallatin County Commissioners, and other local government agencies.

This EA is available online at <http://www.deq.mt.gov/ea/opencut.asp>.

A public hearing on this project will be held in the Gallatin Gateway Community Center on **Thursday September 18, 2008 from 6-10 pm. In the interest of accommodating all speakers, comments will be limited to 3 minutes per speaker.** The second two hours of the hearing will focus on the Nuss-Rock Supplemental EA and the first two hours will focus on a concurrent project, the Morgan EA. A person who wishes to attend but may require accommodations should contact Jo Stephen in advance of the hearing.

If you have any questions, concerns, or comments, you can submit them to DEQ:

- by mail to 1371 Rimtop Drive, Billings, MT 59105; 1520 E. Sixth Avenue, Helena, MT 59620-0901
- by fax to 406-247-4440;

- by e-mail to [jostephen@mt.gov](mailto:jostephen@mt.gov); OR [dsutliff@mt.gov](mailto:dsutliff@mt.gov)
- by phone at 406-247-4435 OR 406-247-4430

All comments received or postmarked prior to close of business **September 24, 2008** will be considered in the formulation of final determinations.

Thank you.

Sincerely,

Jo Stephen, Reclamation Specialist  
Opencut Program, Billings Regional Office  
Industrial Energy and Minerals Bureau  
Phone: 406-247-4435  
Fax: 406-247-4440                      E-mail: [jostephen@mt.gov](mailto:jostephen@mt.gov)  
JS

## **DRAFT SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT**

### **PERMIT TMC-002, THREEWAY MINING COMPANY, INCORPORATED NUSS-ROCK PIT AMENDMENT**

The Department of Environmental Quality (DEQ) prepared this **draft** supplemental environmental assessment (EA) in accordance with requirements of the **Montana Environmental Policy Act (MEPA)**. An EA functions to identify, disclose, and analyze impacts of an action over which the state must make a decision, in this case permitting a gravel pit. MEPA sets no environmental standards and provides no authority for the DEQ to impose conditions or mitigations beyond those allowed under applicable state laws, such as the Opencut Mining Act, the Clean Air Act, or the Water Quality Act. As a result, this document may disclose impacts that have no legislatively required standards (such as noise), or over which DEQ has no regulatory authority (such as traffic). In such instances, a company may voluntarily agree to modify its proposed activities or accept permit conditions. A permit decision is based on whether or not the proposal meets the requirements of the Opencut Mining Act and other applicable environmental laws.

The DEQ developed this **draft** supplemental EA using the best available information. Individuals, agencies, and organizations with knowledge of specific locations or conditions may possess information that was not available to DEQ during preparation of this **draft** supplemental EA. As a result and in accordance with MEPA, DEQ will evaluate comments on this draft supplemental EA submitted by the public and if warranted, compile and further evaluate additional information or data and make revisions that will be incorporated into a final EA. Responses to the public comments and potential permit conditions or mitigation measures developed as a result of public input will also be included in the final EA.

The state law that regulates gravel-mining operations in Montana is the **Opencut Mining Act**. This law and its associated rules place operational guidance and limitations on a project during its life, and provide for the reclamation of land subjected to opencut mining. This law requires the operator to post a bond or other financial instrument so that DEQ has the financial capability to reclaim a mined site to its approved, post-mining land use if the operator is unable or unwilling to do so. Beyond the opencut mining permit, the operator must obtain all other regulatory permits and approvals that are required to conduct operations at the site. Depending on the location and the nature of the operations, additional approvals may include a road access permit, county conditional use permit, water right, air quality permit, floodplain permit, surface water or stormwater discharge permit, or other local, county, state, or federal permits and approvals. Gallatin County has recently imposed emergency zoning restrictions which require the proponent to apply for a Conditional Use Permit (CUP).

**Project Name:** Nuss-Rock Gravel Pit

**Proponent:** Threeway Mining Company, Incorporated (TMC, Inc.)

**Location:** The Nuss-Rock Pit includes the NE¼ of Section 9 and the NW¼ of Section 10,  
Township 3 South, Range 4 East.

**County:** Gallatin

**Type and Purpose of Action:** TMC, Inc. has applied to amend an open gravel pit located in Gallatin County, about ¾ mile west of Gallatin Gateway. Access is from Gallatin County's Cottontail Road. Figures 1 and 2 (at the end of this document) provide maps of the general vicinity and the permit site, respectively.

The July 12, 2007 Amendment Application requests an increase in acreage to a total of 87 acres. The final reclamation plan calls for a 15.7-acre pond surrounded by 8.2 acres of grassland, and a 36.7-acre pond with 26.4 acres of grassland around it (Figure 2). The deepest pond would reach a depth of about 87 feet from the original ground surface, or about 75 feet below the present pond surface.

Additional documentation submitted in their application by TMC, Inc. includes:

- A Montana Pollutant Discharge Elimination System (MPDES) permit for general sand and gravel operations issued October 1, 2007. Its renewal date is 2012.
- A hydrology study including MODFLOW estimates, prepared by Earth & Water, Inc. dated November 2007.
- A survey of soil amounts available for final reclamation dated August 17, 2007.
- A table of water quality tests from May 25, 2005 and August 13, 2007.
- A table of water levels in the three monitoring wells and the southeast trailer.
- A table of water temperatures measured August 13, 2007 in the four wells and at intervals in the depth intervals in the ponds.

**History of the Proposed Action:**

The site was originally permitted by J & S Construction; permit JSC-005, in 1998 for 13.65 acres to be reclaimed in 2001. An EA was written for the initial permit (DEQ 1998). In 2001 an amendment was approved to extend the final reclamation date to 2010. In 2003 the permit was assigned to TMC, Inc. and was given the new permit number TMC-002. TMC, Inc. applied to amend the permit from 13.65 acres to 41.2 acres in the summer of 2004. A supplemental EA was completed and the amendment was granted in November 2004. TMC, Inc. has applied to amend the permit by adding 45.8 acres to the permit area, have two ponds instead of one, and extend the reclamation date to 2020. The total acreage covered by all amendments, if DEQ approves this amendment, would be 87.0 acres. Concurrent reclamation has not been conducted on this site. Ponds currently cover approximately five acres of the site (Figure 2).

During the progression of the development of this site, the following aspects of mining operations have changed (DEQ 2004):

- The original plan called for dewatering the site by drilling three dewatering wells and pumping the water into a ditch that would carry the water offsite. Mining was proposed to go to a depth of about 25 feet leaving a pond at final reclamation. The dewatering wells were never installed. The dewatering ditch was dug and connected to the Monforton ditches that were constructed starting about 1930 to drain pasture lands. The Monforton ditch system connects with Fish Creek, a water of the U.S., a mile to the north. By 2003 the ditch mouth and pond elevation were stabilized at 4,911 feet above mean sea level, or about nine feet below the estimated high water level before mining and 21 feet below original ground surface (bgs) (DEQ 2004).

- TMC, Inc. is mining in the water using excavators and a dragline as described in the plan of operations. However, the pond depth has been increased from approximately 25 feet bgs to approximately 53 feet bgs (TMC, Inc. 2007).
- Three monitoring wells were drilled in 2004 and monthly water level readings have been taken since their installation (Appendix A, Table A-1). Water quality data from these wells have been collected on May 25, 2005 and August 13, 2007 (Appendix A, Table A-3).

### **Description of the Proposed Action**

TMC, Inc. proposes to mine the 45.8 acres covered in the amendment in three phases. Initial development would begin in the northwest 20-acre parcel with installation of the wash plant. Later, mining with loaders and excavators would remove the gravel down to the water table in the western section, Tract 2C-4. Then the dragline would be used to continue into the water table. A 175 to 200-foot buffer would surround the 11.25-acre mine portion of the 22-acre Tract 2C-4.

The crusher would be periodically moved and set up near the active mining area, but no closer than 500 feet from Cottontail Road. Existing 6-foot high soil berms along the south edge of Tract 2C-3 would be left along Cottontail Road, and would be extended west along Tract 2C-4 for noise mitigation (Figure 2). Existing 6-foot soil berms along the east edge of tract 2C-2 would be extended north along Tract 2C-1 (Figure 2). At least 12 inches of topsoil and overburden would be salvaged and stockpiled for reclamation or placed in berms for noise mitigation.

The wash plant would be moved to the southwest corner of the 20-acre northeastern expansion area (Tract 2C-1). Water for operations comes from groundwater. Wash water would be recycled. A 600-foot long ditch would be dug to a 3-acre settling pit for the wash water. There would be no outlet from the wash plant system. Sediment would be removed from the ditch and settling pit as necessary.

Normal operations include mining, crushing, washing, asphalt operations, maintenance, fueling, and other operations. Normal hours of operation would be from 7 a.m. to 6 p.m. Monday through Friday, and 7 a.m. to 6 p.m. on Saturdays for hauling and maintenance. Previously, maintenance was not included on Saturdays. Mining and processing would not be allowed on Saturdays. Equipment maintenance would be scheduled on Saturdays for safety reasons. Hauling or moving existing stockpiles could be done on Saturdays.

Topsoil and overburden berms about 6 feet high would be almost continuous around the site. They would be seeded. This soil is required for reclamation; the berms would not be removed during reclamation. Silt fence or other sediment control devices would be used as necessary. The permit area is currently fenced for livestock.

Please see Figures 3 and 4 at the end of this document for the locations of points of reference in the following descriptions.

**Phase I:** Phase I would mine areas around the west side of Tract 2C-3, and remove material down to within a few feet of the high water level as measured in 2008. The crusher would be placed in this hollow to help with noise abatement. Mining would then continue with excavators or dragline. The crusher would be located in the north central portion of Tract 2C-3, just south of the current wash plant ponds. Stockpiling would occur along the east side of this tract and on Tract 2C-2.

**Phase II:** After Phase I of mining is completed, a three acre pond would be excavated in the northwest corner of tract 2C-1 using loaders down to the water table (Figure 3). Once the water table is encountered excavators and a dragline would be used to bring the pond to its full depth, 89 feet below ground level. Crushing and stockpiling would occur on the south half of Tract 2C-1. The wash plant would be moved to the northeast, and a ditch would be constructed to connect the plant with the three-acre pond. The approximately 600 foot long ditch would trap much of the sediment and would be emptied of sediment as needed. Any remaining sediment would settle to the bottom of sediment pond one. There would be no outlet from sediment pond one. It is anticipated that pond one would hold over 40 times the volume of water produced by the wash plant in an eight-hour shift. If or when fine sediment deposition seals the pond, another settling pond would be excavated to the south.

**Phase III:** As the gravel ore from Phase II is depleted, mining would begin on tract 2C- 4. The tract to be mined in this phase has been divided into four rectangles of 2.8 acres each (Figure 4). Mining down to the water table would begin on the southeast rectangle ("A" in Figure 4). Mining would proceed in a counterclockwise direction through the northeast and northwest rectangles. Last to be mined would be the rectangle to the southwest where the owner's current residence is located. When all areas of this tract are mined down to the water table, a dragline would excavate down to the full depth of 89 feet (75 feet below average water surface). Dragline mining would proceed in reverse order, clockwise beginning in the southwest rectangle ("D" in Figure 4). After each rectangle is mined to depth, the slopes along the exterior sides of the permit area would be graded, topsoil, and seeded.

**Continuing Aspects of the Project:** The existing access road and scale area would remain in their current location throughout the life of the permit. The road would be extended to the southeast as needed. No changes in types of equipment are proposed with this amendment request. Normal hours of operation would continue to be 7:00 am to 6:00 pm Monday through Friday. Hours would be extended to Saturdays from 7 a.m. to 6 p.m. for hauling and maintenance.

**Type and Quantity of Material:**

This amendment #2 application requests an additional 45.8 acres for a total permit area of 87.0 acres. The proponent would mine, crush, wash, transport and stockpile approximately 4.4 million cubic yards of gravel from the proposed site. The material would be sold locally. Twelve inches of topsoil and overburden would be salvaged and placed in berms along all edges of the site.

**Surrounding Land Use:** Residential properties ten acres and larger as well as agricultural lands surround the mine site.

**Traffic:** Truck traffic presently uses two main routes. Trucks making local or north-valley deliveries exit the site and head east through Gallatin Gateway to Highway 191. The Gallatin County road department requested trucks hauling through Gallatin Canyon toward Big Sky exit the site onto Cottontail Road and then turning south onto Gallatin South Road. This route would reduce truck traffic going through Gallatin Gateway. Gallatin South Road intersects with Highway 191 about five miles south of the permit site at the mouth of the canyon. Approximately 10,000 annual off-site deliveries of product would be made each year. This is 10,000 empty trips in and 10,000 loaded trips out of the site. Typical commercial traffic includes 20 cubic yard belly or side dump trucks, 12 cubic yard end dump trucks, and 24 cubic yard dump truck/trailer combinations.

**Hazardous Waste:** Fuel is contained in mobile tanker trucks that do not require secondary containment. There is no permanent fuel storage on site. Asphalt truck cleanout would be

conducted on an inwardly graded pad filled with sand to absorb the fluids. When saturated the sand would be properly disposed of and replaced with clean material.

**Reclamation:** The final reclamation plan calls for a 15.7-acre pond surrounded by 8.2 acres of grassland, and a 36.7-acre pond with 26.4 acres of grassland around it (Figure 2). The deepest pond would extend about 87 feet from the original ground surface, or about 75 feet below the present pond surface. The reclaimed surface surrounding the ponds would be sloped from the undisturbed surrounding ground into the pasture. Backslopes would be scarified or disked if needed and topsoil would be disked prior to seeding. The access road would remain for the landowner to get into the site after reclamation. At final reclamation, a landscaped berm approximately six-feet high would remain along Cottontail Road. Final reclamation would be in the year 2020. TMC, Inc. does not include information regarding future uses of the site after reclamation. The reclamation bond for this permit has been increased to \$126,781 (TMC 2007a).

**Scoping Comments and Concerns:** TMC, Inc. mailed resident notification letters on July 5, 2007 to landowners located within 1,000 feet of the proposed permit site. Several letters, comments, and complaints have been sent or phoned in to DEQ and are summarized in the sections below. Comments regarding potential impacts that would be addressed in this document are noted, and the reader is directed to the appropriate section. Comments related to issues that are beyond the scope of this Proposed Action or are outside of the jurisdiction of DEQ are summarized at the end of the scoping section.

**The following areas of concern were identified by one or more residents in their response to the July 2007 resident notification letters and in numerous contacts with DEQ:**

- Water Use, quality and quantity, water table,
- Aesthetics, Noise, Light, Hours of Operations
- Dust and Air Quality
- Property Values
- Traffic Safety and Highway Impacts
- Emergency Zoning and Mining Moratorium
- Compliance Issues

**COMMENT:** Commentors expressed concern related to surface water impacts to creeks, ditches, flooding; groundwater impacts to well water levels, water rights, and the potential to add to warming of surface and groundwater.

**Response:** Please see Section 1- Geology and Section 2 – Water for baseline information and discussion of possible impacts to both surface water and groundwater.. In the September 2007 violation letter to TMC, Inc., DEQ requested the 2005-2007 data for groundwater monitoring.

**COMMENT:** The commentor suggests the Proposed Action would have a negative effect on dust and ensuing air quality

**Response:** Please see Section 3- Air Quality for discussion of air quality permits, emission limits, health, fugitive dust.

**COMMENT:** The commentor suggests the Proposed Action would have a negative effect on aesthetics, visuals, noise, and light. Commentors expressed concern over hours of operation.

**Response:** Please see Section 8 – Aesthetics for discussion of these issues. DEQ has the authority to set reasonable hours of operation and can enforce violations of permitted hours of operation.

**COMMENT:** The commentor suggests the Proposed Action would increase traffic on Cottontail Road and may increase accidents.

**Response:** *Please see Section 11: Health and Human Safety for a discussion of traffic impacts.*

**COMMENT:** The commentor suggests the Proposed Action may be amended to increase the size of the gravel pit.

**Response:** *DEQ cannot address potential amendments in this EA as they are speculative. DEQ only has authority to permit an action for which they have received an application. Please see Section 16: Locally Adopted Plans for a discussion of zoning and other evolving issues surrounding gravel pits in the vicinity of the Proposed Action.*

**COMMENT:** Concerns were expressed over how Gallatin County's policy on Emergency Zoning and the potential for a limited moratorium on gravel mining might affect this permit amendment.

**Response:** *Please see Section 16 for information on the current status of zoning in Gallatin County related to gravel pit permitting.*

**COMMENT:** The commentor suggests the Proposed Action would have a negative effect on property values

**Response:** *Please see Section 21- Other Economic Issues for a discussion of how gravel pits affect property values.*

**COMMENT:** The public has filed numerous complaints about working outside hours of operation, excessive dust, and noise. What actions has DEQ taken to address these complaints?

**Response:** *DEQ does have authority to set the hours of operation, and can enforce violations of permitted hours of operation. In September 2007, DEQ issued a violation letter to TMC, Inc. documenting two occurrences when the mine was operating outside of its permitted hours of operation, both on weekend days. Other violations addressed in the enforcement letter included stacking outside the permit boundary and not measuring water levels biweekly during high water.*

#### **Alternatives Considered:**

- A.** No Action Alternative: Under this alternative the permit for TMC Inc. to open a gravel pit on the land owned by the Nuss-Rock LLC would be denied. The land would remain as pasture until other uses of the land were proposed and implemented. Gravel consumption is high in this area as a result of increasing population in general and denial of this application would simply move the demand for this gravel, and thus any impacts, into other nearby gravel pit sources.
- B.** Proposed Action: Please see the detailed description of the Proposed Action, above.
- C.** Agency-Modified Alternative: Under the pertinent resource areas, DEQ has included possible mitigation for potential resource impacts described in this draft SEA. Public and agency comments on the draft SEA will be reviewed and DEQ may choose to propose required mitigations as part of its preferred alternative. TMC, Inc. would be required to implement mitigation actions included in that alternative as part of the terms of its permit.



IMPACTS ON THE PHYSICAL ENVIRONMENT
RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES
1. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:
<p><b>Applicant's Proposed Action:</b> The applicant proposes to expand gravel mining operations at the current operation west of Gallatin Gateway. The soils would be salvaged prior to mining and stockpiled along with the existing soils along Cottontail Road. The salvaged soils would be used in final reclamation at the completion of the mine operation</p> <p><b>Existing Environment:</b> The proposed site lies on a bench within the alluvial valley of the Gallatin River and slopes downward to the north. Quaternary alluvium, predominantly stream laid deposits, underlie the soil and overburden in the proposed project area. The unit is identified as Qa on the geology map of the Gallatin Valley (Hackett 1960). More recent mapping by the Montana Bureau of Mines and Geology has further defined these units as Quaternary alluvial terrace (Qat) deposits (Vuke 2002). The Quaternary alluvium consists of cobbles and gravel intermixed with sand, clay, and silt. The upper 20 feet is generally composed of clean and moderately well sorted cobbles and gravel. The thickness of the Qat deposits are unknown. Drillers logs indicate sand and gravel, and a heterogeneous mixture of clay, silt, sand, gravel, and cobbles is generally found at least within the top 100 feet beneath the surface in the valley. The site is located in an area of relatively flat, irrigated agricultural land. Ground surface elevation ranges from about 4932 feet mean sea level (msl) to 4920 feet msl sloping from the southwest to the northeast. In general, three main soil types were identified at the project area and include the following: 1) Meadow Creek silty clay loam, consisting of somewhat poorly drained silty clay and silt loam near the surface and very gravelly loamy sand at depth; 2) Soap Creek, somewhat poorly drained silty clay loam, a silty clay loam near the surface and stratified fine sandy loam to silty loam at depth; and 3) Sudworth silty clay loam, dominantly silty clay loam near the surface, loam at intermediate depths, and extremely gravelly sand at depth (SSURGO 2008). Thickness of soil and overburden likely varies across the site.</p> <p><b>Potential Impacts:</b> Topsoil and overburden would be salvaged and stockpiled along the southern permit boundaries. The topsoil and overburden could be subjected to erosion. However, these stockpiles would be seeded to control both water and wind erosion. Mining operations would occur in phases.</p> <p><b>Reclamation:</b> The site would be reclaimed to two ponds and pasture land for grazing livestock. Reclamation would occur concurrently with mining. After mining, the land would be reclaimed to two ponds, the southerly pond approximately 36.7 acres, and the northerly pond, approximately 15.7 acres. Topsoil would be relocated on the disturbed areas above the water table. The remaining area above the water table would be reseeded and reclaimed. The average annual precipitation in the area is 16 to 18 inches and the growing season is over 100 days per year. Because of the quality of the soil and the amount of available precipitation, this site should reclaim easily. A soil survey conducted in 2007 calculated that the existing stockpiles contain enough overburden and topsoil to cover the pasture areas with 12 inches overburden and six inches of topsoil (Kenai Engineering, Inc. 2007).</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> Some topsoil may be lost during ground disturbance. About 4.4 million cubic yards of material would be mined. Gravel resources</p>

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

would be removed and the commitment cannot be reversed. The pre-mining landscape could not be replaced without refilling the excavation with imported material.

**Cumulative Impacts:** The gravel resource in Gallatin County is not particularly limited in the area. There are numerous sand and gravel operations throughout the Gallatin Valley. Several are located or proposed for location within a few miles of this proposed project area. The proposed operation would add to the cumulative and permanent removal of sand and gravel in the valley as demand for these products increase as a result of new subdivisions, new homes, and associated roads as well as new commercial and industrial structures. The proposed change in the land use from agriculture to a gravel pit and then reclaimed ponds is permanent.

### 2. WATER QUALITY, QUANTITY AND DISTRIBUTION:

**Applicant's Proposed Action:** The applicant proposes to expand the gravel pit operations which would modify the size and area of the ponds upon final reclamation. The existing permit allows the gravel pit operations to leave a single pond up to 24.6 acres. The proposed amendment to the existing permit would create two ponds. The existing (southerly) pond would be expanded up to 36.7 acres. A new (northerly) pond would be completed up to 15.7 acres.

**Existing Environment:** The proposed gravel pit operation is located within the Gallatin River watershed of southwest Montana. Several surface water features are present in the general area of the project site. The Gallatin River is the main surface water body in the project area. Approximately 70 percent of the surface water flow entering the Gallatin Valley enters via the Gallatin River at the mouth of Gallatin Canyon, south of Gallatin Gateway (Hackett 1960). Other surface water flow enters from streams along the margin of the valley. Irrigation ditches and drain ditches are present in the project area. Additionally, local springs are present in the area indicating the presence of shallow groundwater. Groundwater flows generally south to north. The flow in the Gallatin River varies significantly each year since it is primarily dependent upon the amount of snowpack.

#### Groundwater Levels

Water levels have been monitored by the applicant in three monitoring wells and one adjacent domestic well at the current gravel pit operations since 2004 (Figures 3 and 4). The three monitoring wells were installed in 2004 and drilled to a depth of 38 feet bgs. Static water levels in the wells were measured after the wells were installed and ranged from 5 to 8 feet bgs. Water level measurements collected from December 2004 through April 2008 are provided in Table 1 of Appendix A.

The graph below displays the relationship of water level elevations over time. During the short period of monitoring, highest water levels were recorded to occur in mid summer (June-July) in all four wells. This typical summertime rise in water table results from natural snowmelt, precipitation, infiltration, and runoff, and is supplemented by flood irrigation that starts in May and June and continues until September or October. The highest change in water level occurred in Well SW located at the southwest corner of the mining operation (Figure 5). The graph indicates a general downward trend in water levels and the typical groundwater fluctuations expected in an unconfined aquifer. The flow in the Gallatin River varies from year to year depending largely on the amount of snow in the watershed. Recorded discharge from August 2004 through April 2008 for the USGS gauging station located on the Gallatin River at Gallatin Gateway is shown in Table 1. The data

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

indicates that mean monthly discharge on the Gallatin River was generally less than normal discharge since May 2007, and appears to correlate with lower groundwater levels. Low precipitation years likely contributed to this downward trend.

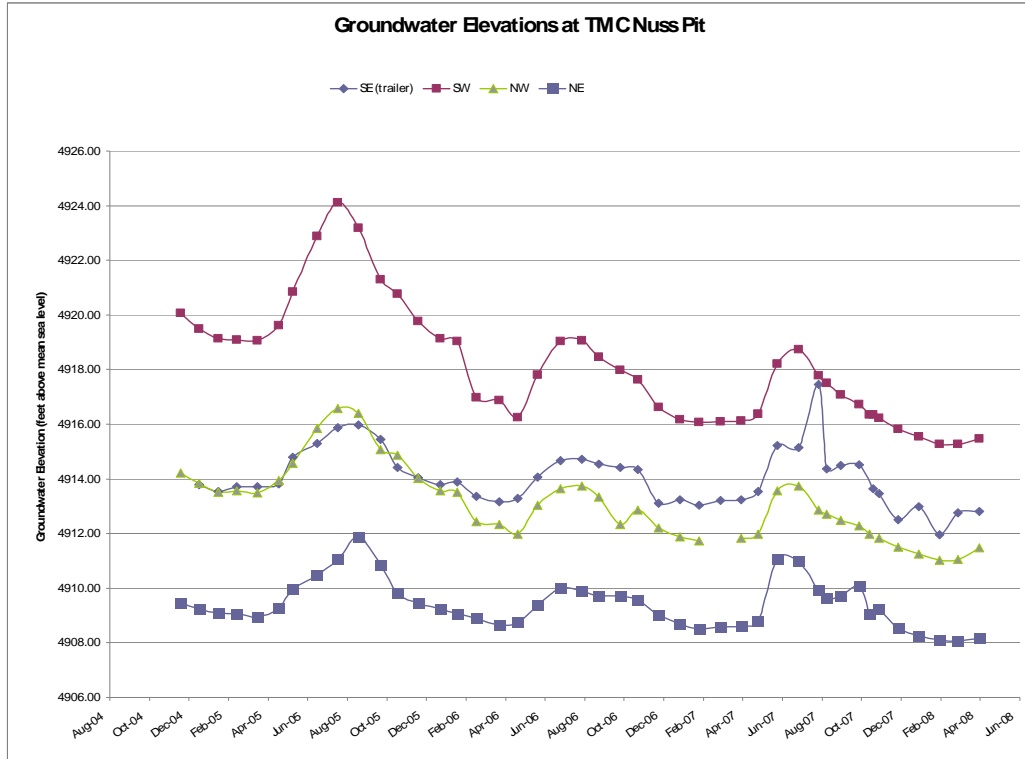


Table 1. Monthly mean discharge in cubic feet per second (CFS) for USGS gauging station 06043500 Gallatin River near Gallatin Gateway, Montana.

	2004	2005	2006	2007	2008	Normal
<b>Jan</b>		255	268	276	255	266
<b>Feb</b>		248	244	269	237	253
<b>Mar</b>		262	257	351	232	290
<b>Apr</b>		386	592	559	313	512
<b>May</b>		1725	2621	2018	---	2120
<b>Jun</b>		2688	2710	1825	---	2410
<b>Jul</b>		1086	865	630	---	860
<b>Aug</b>	480	540	470	419	---	477
<b>Sep</b>	437	399	393	355	---	396
<b>Oct</b>	387	390	425	390	---	400
<b>Nov</b>	321	340	405	301	---	355
<b>Dec</b>	274	272	286	255	---	277

1. Source: USGS Surface Water Data for Montana, National Water Information system: Web Interface, <http://waterdata.usgs.gov/mt/nwis>

2. Values in *italics* indicate mean monthly discharge less than normal discharge for that month

3. Flow data from October 2007 to April 2008 are provisional and are subject to revision by the USGS

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

#### **Groundwater Modeling:**

Rock Pit, LLC, owner of the gravel pit, contracted with Nicklin Earth & Water, Inc. to complete a hydrologic study that included 1) quantifying changes in groundwater levels in the vicinity of the gravel pit for current and future gravel pit operations and 2) estimating pond evaporation (Nicklin 2007). The change in water levels was modeled using the United States Geological Survey groundwater flow model MODFLOW. Model input parameters were not provided to DEQ for review.

Both transient and steady-state simulation tests were modeled and produced similar flow rates resulting from gravel pit dewatering. Drawdown resulting from the proposed actions is predicted to be primarily in a westerly direction from the gravel pit. The model simulation predicted that the maximum relative off-site drawdown comparing the amendment expansion with current water levels would be from less than 1 foot to about 3 feet. The rate of drawdown would decline as the distance from the pit increased. A localized drawdown of 1 to 3 feet would not be expected to adversely impact water users in the area unless the well intake is within a few feet of the water table. However, water would still be available for use if the well intake was extended deeper. At the closest residence with a domestic well, located immediately south and west of the existing pond and gravel pit operation, has a predicted drawdown of 1.4 feet from the proposed amendment activity when compared to existing conditions.

Water level in the pond would be maintained at an elevation of approximately 4,911 feet msl during mining operations and would be maintained at reclamation. Discharge measurements were collected at the pond outlet on May 7 and 8, 2001, and April 17, 2003, and ranged from 3.22 to 3.68 cubic feet per second (cfs). On October 10, 2007, discharge was measured at 8.7 cfs. The variation in flow is likely due to seasonal changes in water levels, expansion of the gravel pit, and deepening of the gravel pit between 2001 and 2007. It is expected that the relative magnitude of the groundwater sink (where the pond is acting like a groundwater drain) would continue to vary as groundwater levels fluctuate (Nicklin 2007).

Estimates of water loss from pond evaporation were calculated (Nicklin 2007). The current permit includes 24.6 acres with an estimated average annual evaporation loss of 43 acre feet. With the increase in acreage to 52.4 acres from the proposed expansion, the estimated evaporation loss is 92 acre feet per year. This amount of consumption (or evaporation loss) is equivalent to the evaporation loss from a 65 acre irrigated alfalfa field.

**Water Quality:** Under state regulations, the quality of state waters cannot be degraded. "State waters" means a body of water, irrigation system, or drainage system, either surface or underground. Sewage lagoons or land application disposal systems are not included (75-5-103(29), MCA). Two water samples were collected from the four monitoring wells in 2005 and 2007. Water samples were collected during two sampling events and analyzed for general water quality parameters, coliform, and petroleum hydrocarbons. Petroleum hydrocarbons were analyzed in samples collected during both sampling events, May 25, 2005 and August 13, 2007. Coliform was analyzed only during the August sampling event. One water sample was collected from the pond outlet in 2007. In addition, water temperatures were recorded in the wells and at various pond depths and the pond outlet on August 13, 2007. Water quality and temperatures are presented in Tables 2 and 3 in Appendix A. Water quality sample results indicate that the groundwater was of good quality. No coliform or petroleum hydrocarbons were reported in the analytical results.

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

Local water temperatures measured in August 2007 were slightly higher near the surface of the pond than at depth in the pond and at the pond outlet. Water temperature variations ranged from 1 to 5 degrees and are comparable to water temperatures recorded in groundwater. A table showing water temperatures at depth in the gravel pit ponds as well as other selected locations is provided in Appendix A.

**Water Use:** The crusher would use about 10 gallons per minute (gpm). Maximum daily water use for the crusher would be about 6,600 gallons per day (gpd). About 20,000 gpd would be used for dust suppression during dry weather in the facility area and the entrance road. This water would be supplied from the ponds.

The major water consumer would be the wash plant. A wash plant uses water to remove fine material less than sand grain size from gravel. The cleaned materials are screened by size and carried by conveyor belts to stockpiles of different sized products including washed sand for mortar, clean rock for concrete, patio rock bedding, sized rocks for drain fields, and other products. The wash water flows by gravity through the plant and drains to a series of settling ponds, carrying the fine silts and clays with it. Ultimately the fine dirt settles in the ponds and the clear water is recycled through the wash plant. Because a wash plant utilizes flowing water, it cannot be operated when temperatures are below freezing.

It is estimated that this proposed wash plant would operate about 6 months per year.

The wash plant uses about 500 gpm. Water is pumped to the top of the plant and infiltrates through the gravel, picking up the fines as it goes. After moving through the washing process and the settling pond, water from the pond would be recycled back to the wash plant to start the loop over again. About 335 gpm of the initial 500 gpm would recycle. Approximately 165 gpm would be consumed by remaining in the products (67,000 gpd), evaporating (8,000 gpd) or infiltrating into the ground (4,000 gpd). The 165 gpm would be made up from fresh water from the canal.

A wash plant would be scheduled to operate and stockpile material during the spring, summer and fall, about 6 months a year. The wash plant's annual consumption is calculated below (DEQ 2003).

165 gpm x 60 min/hr. x 8 hr/day x 5 days/week x 26 weeks = 10,296,000 gallons of makeup water per year, or approximately 30 acre feet.

**Potential Impacts:** Water for the mining operations comes from groundwater and the wash water is recycled. Water samples indicate that temperatures were slightly higher near the surface of the pond and at the pond outlet when compared to temperatures deeper in the pond. If water temperatures were substantially elevated, the potential to impact salmonid species would exist. However, water temperature is only slightly increased as it leaves the pond, and the water would have sufficient time to equilibrate with other surface water and groundwater prior to flowing into fish habitat. Sediment control ponds would be installed to minimize the potential for sediment to flow downstream during excavation. There would be no outlet from the wash plant system. No permanent on-site fuel storage is proposed.

Increase in drawdown due to mining operations is shown in the groundwater model to lower the

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

water table beneath adjacent properties. This lower water table may require surface irrigation on land that was naturally sub-irrigated in the past. However, mining operations would not adversely impact water users in the vicinity of the mine since water is available for surface irrigation.

Continued monitoring water levels and temperatures and collection of water quality samples on a regular basis would provide additional data that would be important to document potential impacts to groundwater and surface water from mining operations.

**Possible Mitigation:**

- Continue water level measurements in three monitoring wells and on-site domestic water supply well
- Continue monitoring of surface water flow from gravel pit
- Continue to measure water temperature in surface water and groundwater
- Collect water samples from monitoring wells at least once a year and analyze for bacteria, domestic suite, and hydrocarbons
- Add two monitoring wells, one in the southwest and one in the northeast.

**Irreversible and Irretrievable Commitments of Resources:** The maximum predicted three feet of groundwater drawdown would be temporary during mining operation.

**Cumulative Impacts:** Water levels are predicted to be drawn down only a maximum of three feet during mining. This predicted drawdown depth would not have an adverse impact on surrounding water rights holders. The Gallatin Valley continues to grow as new subdivisions and commercial developments are proposed and built. If development continues in the immediate area of the gravel pit operations, additional stresses would be placed on the aquifer. However, given the high permeability of the aquifer material underlying the area, overall water level declines should not exceed the predicted drawdown or impact water users in the area. In fact, any development built during mining operations should be aware of water level rebounds that are expected following mining operations and take into account this potential.

### 3. AIR QUALITY:

**Applicant's Proposed Action:** TMC, Inc. intends to expand mining activities an additional 45.8 acres on this site located in Gallatin County immediately west of the city of Gallatin Gateway, and to relocate existing portable rock crushing, gravel washing, and/or an asphalt plant to the expanded mining areas. In addition, stockpiles of aggregate, crushed stone, and concrete and asphalt material for recycle may be stored throughout the current mine and the proposed mine. No additional equipment is anticipated based on the current scope.

**Existing Environment:** The air quality in Gallatin County is in attainment with federal ambient air quality standards, which were set at levels that would protect public health and welfare, (<http://www.deq.state.mt.us/AirQuality/Planning/AirNonattainment.asp>). Furthermore, the only Class 1 designated protection area in this county is Yellowstone National Park, at the southeast corner of the county, approximately 50 miles south of Gallatin Gateway.

Historical use of the agricultural land by plows, discs, seed drills, swathers, combines, balers, etc. have always contributed to the dusty conditions in the area during summer months. Agricultural

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

activities are exempt from the requirements to control or reduce air emissions created by these activities. Existing gravel pit operations occur adjacent to the proposed location. Five quarries are currently active within 20 miles of Nuss Pit and four more have been sited 17 to 25 miles away. The closest active quarries are located 5 miles north near Four Corners (Simpson & Storey) and 8 miles southeast (Huttinga).

The Clean Air Act requires EPA to set National Ambient Air Quality Standards for six common air pollutants. These commonly found air pollutants (also known as "criteria pollutants") are found all over the United States. Criteria pollutants are particulate matter with an aerodynamic diameter of 10 microns or less (PM<sub>10</sub>), carbon monoxide (CO), oxides of nitrogen (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), ozone (O<sub>3</sub>), and lead (Pb). Primary air quality impacts from the proposed project would relocate mining (PM<sub>10</sub>), crushing (PM<sub>10</sub>), screening (PM<sub>10</sub>), material transfer (PM<sub>10</sub>), unloading (PM<sub>10</sub>), fueling (VOC), vehicles (CO, NO<sub>x</sub>, PM<sub>10</sub>), windblown dust from roads and storage piles (PM<sub>10</sub>), and asphalt drum mixing (CO, NO<sub>x</sub>, SO<sub>x</sub>, VOC plus hazardous air pollutants) from the existing locations in Tract 2C-2 and 2C-3 to Tracts 2C-1 and 2C-4 at the north and west of the current project location (Figure 2).

DEQ maintains three air monitoring stations for particulate matter in Gallatin County – Bozeman City Building, Belgrade ConAgra, and West Yellowstone. According to a 2007 presentation of air monitoring data ([http://www.deq.state.mt.us/AirQuality/WhatsNew/BJ\\_Gallatin\\_General\\_Talk.pdf](http://www.deq.state.mt.us/AirQuality/WhatsNew/BJ_Gallatin_General_Talk.pdf)), airborne particulate matter less than 10 microns (PM<sub>10</sub>) has consistently been less than 60 percent of the annual and daily federal regulatory standards since 1996. The Environmental Protection Agency (EPA) established PM<sub>2.5</sub> standards (particulate matter less than 2.5 microns) in 1997 and revised them in 2006. According to the available data, airborne PM<sub>2.5</sub> concentrations (the particulate matter most likely to be inhaled) have been approximately 65 percent or less of the annual standard and 86 percent or less of the daily standard that allows evaluation at the 98<sup>th</sup> percentile values as summarized below [Ref: [http://www.deq.state.mt.us/AirQuality/WhatsNew/PM25\\_NAAQS\\_MT\\_Review\\_Mar\\_2008.pdf](http://www.deq.state.mt.us/AirQuality/WhatsNew/PM25_NAAQS_MT_Review_Mar_2008.pdf)]

**Table 2.** Air quality monitoring stations results for PM<sub>2.5</sub> for Gallatin County 2005-2008.

Monitoring Site	% 24-Hour Limit	% Annual Limit
Belgrade	86	65 <sup>(1)</sup>
Bozeman	63 <sup>(2)</sup>	43 <sup>(2)</sup>
West Yellowstone	34	28

(1) Failed 75% data recovery requirements for calendar year 2005 at Belgrade monitoring site, so annual average is not valid for EPA determination.

(2) Bozeman monitoring site started operation in 2005 so there is not enough data for a valid 3-year average.

Volatile organic compounds (VOC) are the primary emissions from the asphalt operations (many of which are regulated as Hazardous Air Pollutants (HAPS)). VOCs combine with oxides of nitrogen to produce ozone, which is a criteria pollutant and many HAPS have specific health affects. There is currently no EPA approved monitoring site for ozone in Gallatin County so no specific information is available on the existing environment.

Three complaints have been filed regarding the open cut mining operations at Nuss Pit. All three were investigated by DEQ's enforcement division; no violations were observed. The facility was

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

meeting reasonable precautions during the inspections in response to the two dust complaints and the third complaint was closed with no violation as ARMB does not regulate odors.

**Potential Impacts:** The air quality in the area may be degraded to some extent due to the emissions from the proposed site, but the activities and ambient air impact would be limited by DEQ's Air Resources Management Bureau (ARMB).

DEQ has an EPA approved air quality program that meets federal standards. Permits and permit conditions have been established for this site to promote compliance with all applicable air quality rules and standards, and to ensure that properties beyond the plant boundaries (e.g. houses, rivers) would be protected. These rules and standards are designed to be protective of human health and the environment and crushing plants and asphalt manufacturing plants operating in the pit must have an air quality permit to operate.

**Emissions** ARMB evaluates plant emissions, based on accepted emission inventory factors obtained from Federal and State guidance documents, and establishes appropriate limitations to ensure compliance with the National Ambient Air Quality Standards (NAAQS) and Montana Ambient Air Quality Standards for these types of operations. The NAAQS are set at levels that are protective of human health and the environment.

No new sources of emissions are expected from the facility although stockpiles and mining activities would be relocated during the project. Air quality impacts from the proposed project would relocate mining (PM), crushing (PM), screening (PM), material transfer (PM), unloading (PM), fueling (VOC), vehicles (CO, NO<sub>x</sub>, PM), windblown dust from roads and storage piles (PM), and asphalt drum mixing (CO, NO<sub>x</sub>, SO<sub>x</sub>, VOC plus hazardous air pollutants) from the existing locations in Tract 2C-2 and 2C-3 to Tracts 2C-1 and 2C-4 at the north and west of the current project location (Figure 2). Truck emissions and road dust would continue to be generated but the quarry may reduce travel distances for future regional projects.

**Emissions Control** Best Available Control Technology (BACT) must be utilized on equipment operations. BACT for crushing/screening operations typically includes the use of water and water spray bars. BACT for asphalt drum mix and batch mix asphalt plants typically includes the use of baghouses, wet scrubbers, and/or condensers.

Operational conditions have also been established within the associated air permits to ensure that the source complies with existing air quality rules and regulations. ARMB would be responsible for assuring compliance with the conditions of the air permit.

Fugitive dust is normally managed with water spray and regulated at mine sites by gauging opacity - measuring visibility through the dust plume. The application also states that magnesium chloride would be used on the access road. Magnesium chloride has been approved for, and is widely used for dust control on graveled roads, parking lots, etc. Its use as a road and highway de-icer in winter in place of sanding has also reduced air-borne particulate matter. Additional mitigation could include:

- Apply Magnesium chloride in the stockpile area.
- Use tackifiers on the topsoil stockpiles prior to vegetation establishment.
- Plant topsoil stockpiles that would remain longer than one year would be vegetated to



## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

reduce both water and wind erosion.

- Tackifiers could also be used on product stockpiles. (DEQ 2004).

**Odors** Some of these associated emissions produce odors that may not be considered pleasant and many of the HAPS are known to cause cancer but plant operations are limited such that emissions levels would not cause harm to human health. The steam (water) part of the plume from the asphalt plants is not regulated because it dissipates rapidly due to the seasonally warm temperatures.

**Regulatory Oversight** ARMB operates an air quality program that includes permitting, compliance, and enforcement staff. The air quality program staff members are available to answer any specific questions of interested parties including questions in regard to operations of a facility in a particular area, inspections and testing that may be required for the facility, and the compliance history of a facility.

The ARMB responds to complaints about excessive dust and smoke, and enforces compliance with the requirements of the permits that it issues. Any failure on the company's part to comply with required permits issued by ARMB could result in enforcement actions and possible penalties under one or more statutes.

**Irreversible and Irretrievable Commitments of Resources:** None

**Cumulative Impacts:** Particulate emissions are the primary air pollutant of concern due to its affect on respirator health in high risk individuals. Existing sources of particulate matter include upwind fugitive and process emissions from 10 regional quarries, industrial sources, commercial development, unpaved roads, an undefined number of wood stoves, smoke from forest fires, and vehicle emissions.

#### 4. VEGETATION COVER, QUANTITY AND QUALITY:

**Applicant's Proposed Action:** Topsoil and vegetation would be removed and the topsoil would be stockpiled as lands are moved into active mining. Two ponds would remain when reclamation is completed and the stockpiled soil would be used to grade and improve the shorelines of the ponds. The reclamation plan calls for a 15.7-acre pond surrounded by 8.2 acres of grassland, and a 36.7-acre pond with 26.4 acres of grassland around I (Figure 2).

**Existing Environment:** The lands included in this amendment are used for pasture, outbuildings, and a home site. Existing vegetation is a mix of native and non-native pasture grasses and a small lawn is maintained in front of the home. Non-native spruce (*Picea* sp.), Russian olive (*Elaeagnus angustifolia*) and several other tree species are along the fenceline and in the yard. There are some unvegetated areas near the barn and the smaller livestock pens.

Two noxious weeds, Canada thistle (*Cirsium arvense*) and spotted knapweed (*Centaurea biebersteinii*), are known to occur in and around the project area, but have been controlled successfully with herbicide. The site is covered by an approved weed control plan and would be periodically sprayed for control of noxious weeds.

An approved wheatgrass seed mix would be reseeded on the areas not reclaimed to cropland. No rare plants, cover types, or species of special concern were discovered during a literature search

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

conducted by the Montana National Heritage Program (MNHP 2008). No rare plants, cover types, or species of special concern were identified during a ground search.

**Potential Impacts:** The potential for weed seeds to be transported to the area and grow on disturbed lands is of concern. However, the proponent has filed, and gained approval for, a weed control plan and the plan of operations includes measures to prevent the spread of noxious weeds.

**Irreversible and Irretrievable Commitments of Resources:** Some topsoil may be lost during ground disturbance and berm construction. However, the proponent has committed to a reclamation plan that would return some of the lands to its previous condition as pasture when the gravel resource has been depleted. The ponds would represent a change in the land use and a 52.4 acre loss of the existing vegetated lands is anticipated.

**Cumulative Impacts:** The lands surrounding the proposed amendment to the existing gravel pit are primarily a mix of cultivated and pasture lands interspersed with housing on larger (>1 acre) lots. The vegetative community within a five mile radius of the project is a mix of native and non-native plants, but does not include rare or sensitive plants or plant communities (MNHP 2008). Given that the lands would be mined and reclaimed concurrently, the surface disturbance and changes to the vegetation where the lands would be returned to pasture do not represent a long term change to the overall vegetative community of the area surrounding Gallatin Gateway and no measurable cumulative impacts to the vegetative community are likely to occur as a result of the Proposed Action. The replacement of 52.4 acres of surface vegetation with ponds would change the character of the surrounding landscape, but would not contribute significantly to cumulative impacts to vegetation resources in the Gallatin Valley.

### 5. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:

**Applicant's Proposed Action:** The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. After reclamation, two large ponds would remain.

#### Existing Environment:

*Wildlife and Avian Resources:* The location of the proposed operation precludes the significant use of wildlife, although it would be expected to receive transient use by various avian species, deer, and small mammals. The site of the Proposed Action is adjacent to subdivisions, the existing gravel operation, and ranch/pastureland.

*Aquatic Resources:* No waters of the U.S or natural waterways exist on the site. The outflow from the dewatering ditch was dug and connected to the Monforton ditches that were constructed starting about 1930 to drain surrounding pasture lands. The Monforton ditch system connects with Fish Creek, a water of the U.S., a mile to the north. Fish, including trout, have been observed in the ditch near the outflow of the pond (J. Rice, TMC, pers. comm. 2008).

#### Potential Impacts:

*Wildlife and Avian Resources:* The Proposed Action is not expected to have significant impacts to wildlife resources. Creation of the ponds associated with reclamation of the site would likely serve to attract waterfowl, shorebirds, and aquatic wildlife such as muskrat; thus providing some additional habitat. Shorebirds and waterfowl currently use the existing pond.

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

**Aquatic Resources:** The Proposed Action should not affect the flows of the outflow ditch or Fish Creek as the project plan of operations intends to maintain the current practice of allowing water to flow into the canal unimpeded. The proponent's plan of operations includes sediment control measures to reduce the potential for fine sediments to enter the canal. It is unlikely that this Proposed Action has any potential to impact aquatic resources in the short or long term. The fish observed in the outflow canal enter the canal at its confluence with Fish Creek. The augmentation of Fish Creek may serve as an attractant flow to spawning fish moving upstream. Fish that reach the outflow ditch on the mine site may be lost to the fishery. The entrance to the outflow ditch could be screened to prevent fish moving into the ditch, but TMC does not have the authority to screen the ditch outside of their permit boundaries. Fish have been observed in the existing pond, but it is not known if they are year-round residents. No permits are required for establishing a pond unless fish are stocked into the pond from an outside source (M. Vaughn pers. comm. 2008)

Waterfowl and shorebirds presently use the pond. After reclamation, two large ponds would remain and may provide some habitat for fish and other aquatic organisms. The 15.7 acre pond would not be connected to the outflow ditch at any time. Therefore, it would most likely not support a fishery unless a stocking permit is secured.

**Irreversible and Irretrievable Commitments of Resources:** No irreversible or irretrievable impacts to fish or wildlife resources are anticipated as a result of the Proposed Action.

**Cumulative Impacts:** The Proposed Action would not contribute to cumulative impacts to aquatic resources in the Gallatin Gateway area.

### 6. UNIQUE, ENDANGERED, FRAGILE OR LIMITED ENVIRONMENTAL RESOURCES:

**Applicant's Proposed Action:** The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. After reclamation, two large ponds would remain.

**Existing Environment:** The lands are primarily used as pasture and are surrounded by open fields, actively-grazed lands and dispersed home sites. No threatened or endangered species, species of special concern, or identified habitat were found on the site (MNHP 2008). No wetlands are present.

**Potential Impacts:** No unique, endangered, fragile or limited environmental resources were identified in the review of the existing environment. Therefore, there is no potential for resources of these kinds to be impacted by the Proposed Action.

**Irreversible and Irretrievable Commitments of Resources:** The Proposed Action would not result in any irreversible or irretrievable commitments of unique, endangered, or fragile environmental resources.

**Cumulative Impacts:** The Proposed Action would not contribute to cumulative impacts to unique, endangered, or fragile environmental resources in and around the project area.

IMPACTS ON THE PHYSICAL ENVIRONMENT
RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES
7. HISTORICAL AND ARCHAEOLOGICAL SITES:
<p><b>Applicant's Proposed Action:</b> The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. After reclamation, two large ponds would remain.</p> <p><b>Existing Environment:</b> A Class I study involved a file search at the Montana State Historic Preservation Office (MT SHPO). No Class III cultural resources inventories have been conducted within the project area. Hence, it is currently not known if any prehistoric or historic period cultural properties are located within the proposed project area.</p> <p>The amendment area has been disturbed over the years through construction of buildings, corrals, drainage ditches, irrigation ditches, and landscaping, plowing and vegetation to hayland.</p> <p><b>Potential Impacts:</b> A walkover of the amendment area during a site inspection by DEQ personnel did not reveal any surface artifacts. No artifacts have been seen in the topsoil stockpiles or along the drainage ditch or irrigation ditches. The buildings do not qualify for listing under the national Historic Preservation Act. Because the surface soil layers have been disturbed many times the integrity of a possible surficial site probably has been destroyed.</p> <p>If significant cultural resources are found to exist within the project area they would be subjected to adverse impacts through the gravel pit excavation and operation, unless they could be avoided. If, during the course of project operations, cultural resources are inadvertently discovered, the SHPO would be notified and mining operations would be shifted to another area for a reasonable length of time to allow for assessment of the new discoveries and determine appropriate mitigation.</p> <p>No paleontological resources have been found at this site. Some paleontological objects have been found during mining operations in other parts of the county. These were reported and appropriate mitigation was implemented.</p> <p><b>Irreversible and Irrecoverable Commitments of Resources:</b> If cultural resources were not recognized, disturbance to sites would result in irreversible and irretrievable loss of such resources.</p> <p><b>Cumulative Impacts:</b> Cumulative impacts to cultural resources would not occur.</p>
8. AESTHETICS:
<p><b>Applicant's Proposed Action:</b> The site is currently an open gravel pit, with an Amendment Application request to increase the acreage to a total of 87 acres with two ponds. The deepest pond would reach a depth of about 87 feet from the original ground surface, or about 75 feet below the present pond surface. The ponds would be mined in the water using excavators and a dragline. The mobile crusher (approximately 17 feet in height) would be periodically moved and set up on a pad a few feet above the high water level near the active mining area, but no closer than 500 feet from Cottontail Road. The overburden berms on the south and east site boundaries would be extended to include the east, south, west and northwest proposed permit boundaries, surrounding approximately three-quarters of the site.</p> <p>Hours of operation would be 7:00 a.m. to 6:00 p.m. Monday through Friday, and 7:00 a.m. to 6:00</p>

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

p.m. on Saturdays for hauling and maintenance. Normal operations would include mining, crushing, washing, asphalt operations, maintenance, and fueling. The primary noise sources would be the mobile crusher, the asphalt plant, and diesel heavy equipment (e.g., front end loaders and haul trucks).

*Visual Resources:* The appearance of the proposed project area is consistent with the surrounding lands. This site is a flat pasture with a few farm buildings, fences and a single home.

**Existing Environment:** The existing areas around the site are agricultural and pasture land with scattered 10+ acre residential properties. The site is accessed from the south off of Cottontail Road and US 191 is located about 0.75 miles to the east. The closest residences are approximately 150 feet north of the existing north permit boundary, and approximately 270 feet south of the existing south permit boundary (south of Cottontail Road) (**Figure 5**). The terrain is generally flat with hills to the west.

#### *Noise Terminology*

Noise is generally defined as unwanted sound, and can be intermittent or continuous, steady or impulsive, stationary or transient. Noise levels heard by humans and animals are dependent on several variables, including distance and ground cover between the source and receiver and atmospheric conditions. Perception of noise is affected by intensity, frequency, pitch and duration. Noise can influence people by interfering with normal activities or diminishing the quality of the environment.

Noise levels are quantified using units of decibels (dB). Decibels are logarithmic values, and cannot be combined using normal algebraic addition. Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies, and the “A-weighting” of noise levels, or A-weighted decibels (dBA), closely correlates to the frequency response of normal human hearing.

For environmental noise studies, noise levels are typically described using A-weighted equivalent noise levels,  $L_{eq}$ , during a certain time period. The  $L_{eq}$  uses a single number to describe the constantly fluctuating instantaneous ambient noise levels at a receptor location during a period of time, and accounts for all of the noises and quiet periods that occur during that time period. The  $L_{eq}$  is similar to the average noise level during a given time period. The  $L_{max}$  noise metric describes the highest instantaneous noise level during a period of time.

The  $L_{90}$  metric indicates the single noise level that is exceeded during 90% of a measurement period, although the actual instantaneous noise levels fluctuate continuously. The  $L_{90}$  noise level is typically considered the ambient noise level, and is often near the low end of the instantaneous noise levels during a measurement period. It typically does not include the influence of discrete noises of short duration, such as car doors closing, bird chirps, dog barks, car horns, etc. If a continuously operating piece of equipment is audible at a measurement location, typically it is the noise created by the equipment that determines the  $L_{90}$  of a measurement period even though other noise sources may be briefly audible and occasionally louder than the equipment during the same measurement period.

The day-night average noise level,  $L_{dn}$ , is a single number descriptor that represents the constantly varying sound level during a continuous 24-hour period. The  $L_{dn}$  can be determined using 24

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

consecutive one-hour  $L_{eq}$  noise levels, or calculated using measured  $L_{eq}$  noise levels during shorter time periods. The  $L_{dn}$  includes a 10 decibel penalty that is added to noises that occur during the nighttime hours between 10:00 p.m. and 7:00 a.m., to account for people's higher sensitivity to noise at night when the background noise level is typically low. The  $L_{dn}$  does not provide specific information about the number of noise events or the noise level at any particular time, but rather it represents the total sound environment during a 24-hour period.

#### *Noise Regulations*

No state or county noise regulations exist to govern environmental noise levels or noise that generated by the Proposed Action, however, federal noise guidelines apply. As a result of the Noise Control Act of 1972, the EPA developed acceptable noise levels under various conditions that would protect public health and welfare with an adequate margin of safety. The EPA identified outdoor  $L_{dn}$  noise levels less than or equal to 55 dBA are sufficient to protect public health and welfare in residential areas and other places where quiet is a basis for use (EPA 1979). Although the EPA guideline is not an enforceable regulation, it is a commonly accepted target noise level for environmental noise studies.

In addition to the EPA's  $L_{dn}$  55 dBA limit, an increase in ambient noise levels can also be used to gauge community response to a new noise. If a project-related noise does not significantly increase the community's existing  $L_{dn}$ , then little or no community reaction is expected. If a project causes an increase in the  $L_{dn}$  of 5 to 10 dBA, sporadic to widespread complaints should be anticipated. An increase of more than 10 dBA may result in strong negative community reaction (FTA 1995).

#### *Noise Level Measurements*

The existing ambient noise levels were measured in March 2008 at two representative residential locations around the Nuss-Rock pit to determine the general conditions (**Figure 5**); however, a crusher was not on site. One set of measurements was made during the day and another was made during the nighttime hours. Each measurement period at each location was approximately 5 to 10 minutes in duration, and the equivalent noise level,  $L_{eq}$ , and the 90<sup>th</sup> percentile exceeded level,  $L_{90}$ , for each measurement period were recorded to help quantify the general ambient noise conditions. The measured  $L_{eq}$  data were used to calculate the existing day-night average noise level,  $L_{dn}$  (FTA 1995). The noise level measurements are summarized in **Table 3** on the following page. The measured  $L_{90}$  and calculated  $L_{dn}$  levels are typical for light population density areas (Harris 1998). As noted in the table, a loader was operating in the pit during the daytime measurements, but the crusher was not on site.

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

**Table 3:** Summary of Existing Ambient Noise Levels without Crusher Operating

Measurement Location	Date and Time (hours)	Noise Sources During Measurements	Measured $L_{eq}$	Measured $L_{90}$	Calculated $L_{dn}$
N1	3/11/08 1018 to 1023	Loader and backup alarm in gravel pit, traffic on nearby roads, tractor in NW field, birds, and wind in grass.	37	33	40
	3/10/08 2221 to 2232	Wind, dog barking in distance, commercial jet in distance, and US 191 traffic.	35	27	
N2	3/11/08 1036 to 1042	Loader and backup alarm in gravel pit, US 191 traffic, tractor in SW field, dog barking, cows and birds.	35	32	37
	3/10/08 2242 to 2252	Geese and cows in distance and US 191 traffic.	32	27	

#### ***Existing Pit Noise Levels:***

Since the existing pit is operational but the crusher was not on site during the measurements, the  $L_{dn}$  due to the crusher was calculated. In gravel pits, the typical dominant noise source that determines the  $L_{dn}$  is the crusher, and typically, there are two loaders operating with the crusher (BSA 2008). Noise levels were predicted at various distances from the typical crusher location for general information since the crusher can be moved around the pit. Noise level calculations included the estimated effects of distance, ground attenuation and attenuation resulting from air absorption per international standards (ISO 1996). Although the calculations conservatively assume that atmospheric conditions are favorable for noise propagation, the estimated noise levels can vary significantly due to atmospheric conditions, and should be considered average noise levels, since temporary significant positive and negative deviations from the averages can occur (Harris 1998). Typically, favorable atmospheric conditions for noise propagation means that the wind is blowing from a source to a receiver at approximately 2 to 10 miles-per-hour, and a well-developed temperature inversion is in place, which typically occurs between approximately 2 hours after sundown to 2 hours after sunrise.

Diesel-powered equipment, such as loaders and excavators, intermittently reach maximum noise levels,  $L_{max}$ , 85 dBA at a distance of 50 feet from the equipment (FTA 1995). Mobile crushers have been measured at  $L_{eq}$  66 dBA at 1,050 feet away from the equipment with a direct line of site from the listener to the equipment (BSA 2008). However, equipment noise can vary considerably depending on age, condition, manufacturer, use during a time period, changing distance and whether a direct line of sight is available between the equipment to a listener location. Please note that the source  $L_{max}$  and  $L_{eq}$  data are used to determine the  $L_{dn}$  based on the times of day and duration that the equipment operates. Based on a sign at the entrance to the existing pit, the hours of operation are currently 8:00 a.m. to 5:00 p.m.

The estimated noise levels of the crusher operations in the existing Nuss-Rock Pit at varying

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

distances are summarized in **Table 4**. If the line of sight is blocked due to topography, depth of the pit, or constructed berms, the estimated noise levels would be reduced by 6 dBA or more due to shielding. As shown, the noise levels with a crusher operating and with a direct line of sight to a listener are currently within the EPA  $L_{dn}$  55 dBA guideline at approximately 0.5 miles (2,640 feet) of the equipment, and within approximately 0.25 miles (1,320 feet) if the line of sight to the equipment is blocked.

**Table 4:** Estimated Noise Levels at Various Distances for an Existing Typical Crusher Location

Project Equipment Assumptions/ Primary Noise Source(s)	Condition	Noise Level at Receiver		
		0.25 miles (1,320 feet)	0.5 miles (2,640 feet)	1 mile (5,280 feet)
<ul style="list-style-type: none"> <li>Crusher operating continuously between 7 a.m. and 7 p.m.</li> <li>Two loaders that reach <math>L_{max}</math> 40% of time between 7 a.m. and 7 p.m. (EPA 1971)</li> </ul>	Direct line of sight between sources and listener	$L_{dn}$ 59 dBA	$L_{dn}$ 53 dBA	$L_{dn}$ 45 dBA
	Line of sight between sources and listener blocked	$L_{dn}$ 53 dBA	$L_{dn}$ 47 dBA	$L_{dn}$ 39 dBA

#### Potential Impacts:

*Noise: For human health impacts of noise please see Section 11 – Human Health and Safety*

#### Proposed Operations

The estimated Proposed Action noise levels at varying distances are summarized in **Table 5**. If the line of sight is blocked due to topography, depth of the pit, or constructed berms, the estimated noise levels would be reduced by 6 dBA or more due to shielding. As shown, the  $L_{dn}$  values of the Proposed Action are approximately 1 dBA higher than those for existing crusher operations, with the difference due to a 2-hour increase in operating time for the Proposed Action. The predicted project noise levels with a direct line of sight to a listener are predicted to be within the EPA  $L_{dn}$  55 dBA guideline within approximately 0.5 miles (2,640 feet) of the equipment, and within approximately 0.25 miles (1,320 feet) if the line of sight to the equipment is blocked.

**Table 5:** Estimated Noise Levels at Various Distances for a Proposed Action Typical Crusher Location

Project Equipment Assumptions/ Primary Noise Source(s)	Condition	Noise Level at Receiver		
		0.25 miles (1,320 feet)	0.5 miles (2,640 feet)	1 mile (5,280 feet)
<ul style="list-style-type: none"> <li>Crusher operating continuously between 7 a.m. and 7 p.m.</li> <li>Two loaders that reach <math>L_{max}</math> 40% of time between 7 a.m. and 7 p.m. (EPA 1971)</li> </ul>	Direct line of sight between sources and listener	$L_{dn}$ 60 dBA	$L_{dn}$ 54 dBA	$L_{dn}$ 46 dBA
	Line of sight between sources and listener blocked	$L_{dn}$ 54 dBA	$L_{dn}$ 48 dBA	$L_{dn}$ 40 dBA

The nearest residence to the north is approximately 600 feet from the proposed central crusher location. The predicted  $L_{dn}$  54-60 dBA (**Table 5**) at 0.25 miles (1,320 feet) from the crusher is



## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

approximately 1 dBA higher than the noise of the existing crusher (**Table 4**), which would not be a noticeable increase. However, the proposed project  $L_{dn}$  54-60 dBA at 0.25 miles would equal or exceed the estimated existing  $L_{dn}$  40 dBA at Location N1 (**Table 3, Figure 5**) without the crusher operating by up to 20 dBA, and therefore, the crusher operations would continue to be the dominant ambient noise source during the day on Monday through Friday when the crusher is operating. Based on the  $L_{dn}$  54 to 60 dBA at 0.25 miles (1,320 feet), the predicted levels at 600 feet from the crusher would be  $L_{dn}$  61 to 67 dBA, which exceeds the EPA  $L_{dn}$  55 dBA guideline whether the line of sight is blocked or not.

The nearest residence to the south is approximately 0.2 miles (1,050 feet) from the typical crusher location. The predicted  $L_{dn}$  54-60 dBA (**Table 4**) at 0.25 miles (1,320 feet) from the crusher is approximately 1 dBA higher than the noise of the existing crusher (**Table 5**), which would not be a noticeable increase. However, the proposed project  $L_{dn}$  54-60 dBA at 0.25 miles would equal or exceed the estimated existing  $L_{dn}$  37 dBA at Location N2 (**Table 3, Figure 5**) without the crusher operating by up to 23 dBA, and therefore, the crusher operations would continue to be the dominant ambient noise source during the day on Monday through Friday when the crusher is operating. Based on the  $L_{dn}$  54 to 60 dBA at 0.25 miles (1,320 feet), the predicted levels at 1,050 feet from the crusher would be  $L_{dn}$  56 to 62 dBA, which exceeds the EPA  $L_{dn}$  55 dBA guideline whether the line of sight is blocked or not.

#### *Back-up alarms*

Because of their intermittent, high-pitched, impulsive sound, back-up alarms can cause high levels of annoyance and numerous complaints even at low noise levels, but have little influence on  $L_{eq}$  or  $L_{dn}$  values. Federal regulations indicate that backup alarms shall be audible above the surrounding background noise level behind the equipment, but does not specify a particular noise level (MSHA 2008). In general, back-up alarm sound levels can vary between  $L_{max}$  87 and 112 dBA at 4 feet away, depending on their volume setting, and whether the listener is to the side or directly behind a directional backup alarm. Directional back-up alarms are being considered for Nuss Pit equipment.

The estimated back-up alarm noise levels are summarized in **Table 6**. In **Table 6**, the low number of the stated noise level range indicates the noise to the side of the directional alarm, and the high number indicates the noise level directly behind the alarm. The directional back-up alarms being considered for the proposed gravel pit could be between  $L_{max}$  31 and 62 dBA at 0.25 miles away. Compared to the measured existing daytime ambient ( $L_{90}$ ) noise level of 33 dBA at Location N1 northwest of the site and 32 dBA at Location N2 south of Cottontail Road (**Table 3**), the back-up alarms could be equal to the  $L_{90}$  when a listener is to the side of the equipment, which would likely be inaudible, or up to 30 dBA over the  $L_{90}$  in the area when the back of the equipment is directed at a listener, which could be clearly audible.

**Table 6:** Estimated Noise Levels at Various Distances from Back-up Alarms

Equipment / Noise source(s)	Condition	Noise Level at Receiver		
		0.25 miles (1,320 feet)	0.5 miles (2,640 feet)	1 mile (5,280 feet)
• Back-up alarm	Direct line of sight between sources and listener	$L_{max}$ 37-62 dBA	$L_{max}$ 31-56 dBA	$L_{max}$ 25-50 dBA
	Line of sight between sources and listener blocked	$L_{max}$ 31-56 dBA	$L_{max}$ 25-50 dBA	$L_{dn}$ 19-44 dBA

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

#### *Possible Mitigation*

The following measures could be considered to reduce the noise of the project:

- Restrict the crusher and asphalt plant operation to workday hours (8:00 a.m. to 5:00 p.m.).
- Add berms or barriers along the north and northeastern permit boundaries, in order to completely surround the site (see **Tables 4-6**).
- Locate the crushing operation as far from residences as is possible.
- Replace standard back-up alarms with Mine Safety and Health (MSHA)-approved, manually adjustable, ambient-sensitive, directional sound technology, or strobe light alarms. Adjustable and ambient-sensitive alarms typically limit the alarm noise to 5 to 10 dBA above the background noise, which would still typically be audible behind the equipment.
- Install high-grade mufflers on all diesel-powered equipment.
- Implement a regular maintenance schedule to ensure that equipment is operating properly.
- Use new equipment rather than older equipment.

*Visual Resources:* Once the overburden berms are established and seeded, mining operations would be shielded from view. However, the berms would continue to be noticeable from the roadway. The berms would not be high enough to block the view of the nearby hills, and should not represent an appreciable impact on the visual resources of the surrounding area. The gravel stockpiles should be maintained at a height such that they do not obstruct or conflict with views of the hills and surrounding mountains. The proposed “Good neighbor” provisions suggest that stockpiles should not exceed 24 feet (GCC 2008).

#### **Irreversible and Irretrievable Commitments of Resources:**

*Noise:* The change in noise due to the Proposed Action would not represent any irreversible or irretrievable commitments of resources.

*Visual Resources* Changes to the visual resources and scenery during active mining should be partially shielded by the proposed overburden berms. Once reclamation is completed the lands not committed to ponds would be graded and seeded to resemble the surrounding pasture lands. Therefore, any impacts to visual resources would be short-lived and do not represent an irreversible or irretrievable commitment of resources.

#### **Cumulative Impacts:**

*Noise:* Cumulative effects from the construction and operation of the Proposed Action include the combination of noise sources from the existing Nuss-Rock Pit operations and other noise sources. In addition to the mine operations and equipment, other noises, such as wildlife, traffic noise from Cottontail Road, US 191 and nearby roads, and noise from residential and ranching activities, are also present in the vicinity of the project area, and would remain into the future. However, the noise due to the Proposed Action would continue to be the dominant noise source in the area on weekdays when the crusher is operating.

*Visual Resources:* The character of the lands near Gallatin Gateway has evolved from primarily open pasture and agriculturally cultivated lands to include small industrial and retail businesses, and dispersed home sites. Because the proposed change in land use to an active gravel pit is a temporary action, and the lands would be reclaimed to resemble their current topography outside of the areas

IMPACTS ON THE PHYSICAL ENVIRONMENT
RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES
<p>committed to ponds when the mine closes, the Proposed Action would not contribute to the cumulative impacts to visual resources in the Gallatin Valley.</p>
<p>9. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR OR ENERGY:</p>
<p><b>Applicant's Proposed Action:</b> The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.</p> <p><b>Existing Environment:</b> The appearance of the proposed project area is consistent with the surrounding lands. This site is a flat pasture with a few farm buildings, fences and a single home. Gravel resources in Gallatin County are not particularly limited in the area. However, some of the gravel resources are located in floodplains and development of those deposits could pose environmental problems. Also, subdivisions are expanding so that quickly it is becoming difficult to locate a gravel operation that does not abut some residences, and thus generate complaints. When gravel is used from pits located at a distance from the point of use, public complaints are registered about increased traffic and air pollution from trucks on the roads, wasting resources because of increased travel distances and increased costs of gravel products.</p> <p><b>Potential Impacts:</b> Impacts to the geology, other than the removal of gravel resources, were not identified. Water table would be lowered approximately 3 feet near the gravel pit pond and not measurable a short distance from the ponds. This lowering of the water table would not have an adverse impact on the water rights users.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> About 4.4 million cubic yards of material would be mined and removed from the site. Gravel resources would be lost and the commitment cannot be reversed without refilling the excavation with imported material.</p> <p>The mining and removal of gravel is irreversible. According to figures submitted to the Opencut Program in annual reports, in 2002, the Gallatin County Road Department operated 9 pits and mined 25,350 cubic yards of gravel from them, mostly for maintenance of the county road system. The road department also purchased gravel materials such as asphalt, sand and some gravel, and contracted chip sealing from the private sector. The private sector operated 32 pits and mined 2,110,502 cubic yards in 2002. With an estimated population in Gallatin County of 72,000 people the average gravel usage per person was 29.3 cubic yards in 2002.</p> <p>Gallatin County is one of the fastest growing counties in the state with a 2006 population estimate of 81,000 people (U.S. Census 2006). Gravel operators reported that a total of 2.7 million cubic yards of aggregate was mined in Gallatin County in 2006. That is an increase of 600,000 cubic yards annually between 2002 and 2006 and an average of 31 cubic yards for every person in Gallatin County. In 2006 the average gravel use statewide in Montana was 18 cubic yards per person per year. The Storey Pit and the proposed Nuss-Rock Pit expansions are approximately eight and four miles from the Morgan Pit, respectively. When combined, these three pit applications are requesting permission to mine approximately 8.0 million cubic yards of material over the next 9 to 20 years. If these three pits attempted to service the complete gravel needs of</p>

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

Gallatin County, they would be depleted in less than three years.

**Cumulative Impacts:** The gravel resource in Gallatin County is not particularly limited in the area. There are numerous sand and gravel operations throughout the Valley. Several are located or proposed for location within a few miles of this proposed project area. The proposed operation would add to the cumulative and permanent removal of sand and gravel in the valley as demand for these products increase as a result of new subdivisions, new homes, and associated roads as well as new commercial and industrial structures. The proposed change in the land use from agriculture to a gravel pit and then reclaimed ponds is permanent.

### 10. IMPACTS ON OTHER ENVIRONMENTAL RESOURCES:

**Applicant's Proposed Action:** The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.

**Existing Environment:** There are no known studies, plans or projects on this tract at this time.

**Potential Impacts:** There would be no known impacts to other resources.

**Irreversible and Irretrievable Commitments of Resources:** The Proposed Action would not result in any irreversible or irretrievable commitments of environmental resources in addition to the previously stated impacts to gravel resources.

**Cumulative Impacts:** The Proposed Action would not contribute to cumulative impacts to other environmental resources in and around the project area.

### 11. HUMAN HEALTH AND SAFETY:

**Applicant's Proposed Action:** **Applicant's Proposed Action:** The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.

**Existing Environment:**

*Noise:* Please see the "Existing Environment" description under Section 8: Aesthetics.

**Potential Impacts:**

*For a discussion of impacts to water quality related to human health issues please refer to Section 2: Water Quality. For impacts to air quality, see Section 3: Air Quality.*

*Noise:* The primary human effect due to noise is annoyance. The degree of annoyance due to a noise is subjective and can vary dramatically from person to person based on the level, duration and frequency content of the noise, and other non-acoustic factors, such as prior exposure to similar noises, the age and health of a listener, attitude toward the noise source, the time of day that

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

the noise occurs, etc. Other effects on humans may include speech interference, stress reactions, sleep interference, lower morale, efficiency reduction, and fatigue (Harris 1998). However, the EPA guideline of  $L_{dn}$  55 dBA or less was determined as sufficient to protect public health and welfare in residential areas (EPA 1979). The noise from the Proposed Action is not expected to exceed the EPA guideline beyond 0.5 miles (2,640 feet) from the crusher location, but residences are located within this 0.5 mile radius.

*Traffic:* Haul trucks would access the site from Cottontail Road. To get to US 191 north, trucks would travel east on Cottontail Road through Gallatin Gateway, or turn onto Gallatin South Road which intersects with US 191 near the mouth of Gallatin Canyon. This route would be used primarily for loads servicing Big Sky. The existing route through Gallatin Gateway speed limit is 25 mph for cars and 15 mph through a school zone. The closest residences along Gallatin South Road are approximately 40 feet from the centerline of the road. The proposed pit would add 13 haul trucks to the a.m. peak hour traffic and 10 haul trucks to the p.m. peak hour traffic based on studies for similar gravel pits (Morrison Maierle 2008).

**Table 7** summarizes the predicted traffic noise levels. The predicted traffic noise  $L_{eq}(h)$  levels due to truck traffic from the gravel pit do not exceed the Montana Department of Transportation (MDT)  $L_{eq}(h)$  66 dBA traffic noise impact criteria (MDT 2001).

**Table 7:** Summary of predicted traffic noise levels at 40 feet from centerline of Gallatin South Road.

a.m. Peak Hour $L_{eq}(h)$	p.m. Peak Hour $L_{eq}(h)$
57	56

#### **Possible Mitigation**

The following measures could be considered to reduce the impacts to human health and safety of the project:

- Restrict truck traffic through Gallatin Gateway during school hours (8 a.m. to 4 p.m.)

#### **Irreversible and Irretrievable Commitments of Resources:**

*Noise:* The change in noise due to the Proposed Action would not represent any irreversible or irretrievable commitments of resources.

*Truck Traffic:* The changes in the truck and highway traffic due to the Proposed Action would not represent any irreversible or irretrievable commitments of resources.

#### **Cumulative Impacts:**

*Noise:* Cumulative effects from the construction and operation of the Proposed Action include the combination of noise sources from the mine and other noise sources. In addition to the mine operations and equipment, other noises, such as natural sources, traffic noise from Cottontail Road, and noise from recreational and residential activities, are also present in the vicinity of the project area, and would remain into the future. However, the noise due to the Proposed Action would become the dominant noise source in the area when the crusher is operating, and would increase the noise above existing levels up to 1 mile from the site.

IMPACTS ON THE PHYSICAL ENVIRONMENT
RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES
<p><i>Truck Traffic:</i> The proposed Nuss-Rock Pit is not likely to increase truck traffic on US 191 because the rate of gravel extraction is not anticipated to change. The number of additional average weekday trips would be spread across the workday and would not significantly contribute to an increase in overall traffic on this highway.</p>
<p>12. INDUSTRIAL, COMMERCIAL AND AGRICULTURAL ACTIVITIES AND PRODUCTION:</p>
<p><b>Applicant's Proposed Action:</b> <b>Applicant's Proposed Action:</b> The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.</p> <p><b>Existing Environment:</b> The area covered in the proposed permit amendment is used for gravel mining and for agricultural production in the form of livestock pasture.</p> <p><b>Potential Impacts:</b> There would be a loss of grazing and cropping on about 45.8 acres of land as the area is rotated from undisturbed to active mining. The site would be fully reclaimed by the year 2020. The reclamation plan would permanently convert 52.4 acres of the 87 acre area to ponds with the surrounding area in grassland.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> Once the area is fully reclaimed, it would be changed from open lands to a large pond or ponds. Removal of the gravel would make it impossible to return the land to its current use as pasture and cropland without filling in the gravel pits. Therefore, there would be irreversible and irretrievable commitments of industrial, commercial, or agricultural resources as a result of this Proposed Action.</p> <p><b>Cumulative Impacts:</b> There are several gravel pits in operation or proposed for permitting within Gallatin County. The Nuss-Rock pit would contribute to the cumulative impact of the removal of gravel, a nonrenewable resource, in the Gallatin Valley. The reclamation plan would convert approximately 52 acres of agricultural lands to ponds. This conversion of land use would contribute to cumulative impacts of loss of agricultural production in and around the project area. However, as the lands are not currently managed for production of crops or livestock, the contribution is not likely to be substantial.</p>
<p>13. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:</p>
<p><b>Applicant's Proposed Action:</b> Although the Proposed Action would expand the total area to be mined, the rate of gravel extraction would remain unchanged. Therefore, the Nuss-Rock pit would continue to support approximately the same number of jobs associated with the existing gravel operation.</p> <p><b>Existing Environment:</b> The number of jobs supported by the Nuss-Rock Pit areas throughout the year varies, and is related to the local demand for gravel. On average, approximately seven full-time employees are supported by the pit. This number does not include truck drivers contracted by</p>

IMPACTS ON THE PHYSICAL ENVIRONMENT
RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES
<p>customers of TMC, Inc.</p> <p><b>Potential Impacts:</b> The Proposed Action would likely maintain jobs associated with the existing operation, including contracted truck drivers. There may be potential for indirect job creation due to continued industrial resource development.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> No irreversible or irretrievable commitments of employment resources are associated with the Proposed Action.</p> <p><b>Cumulative Impacts:</b> There are no cumulative impacts to employment associated with the Proposed Action.</p>
14. LOCAL AND STATE TAX BASE AND TAX REVENUES:
<p><b>Applicant's Proposed Action:</b> <b>Applicant's Proposed Action:</b> The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.</p> <p><b>Existing Environment:</b> The lands covered in this amendment are currently used as pasture land. These lands are taxed at agricultural rate. The areas covered under the existing permit are considered industrial.</p> <p><b>Potential Impacts:</b> A slight increase in tax revenue could occur because of this project. Gravel pits are generally appraised in the industrial category, which is a higher rate than the present agricultural rate. Also, some jobs would be supported by this pit, thus increasing both income and payroll taxes.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> There are no irreversible or irretrievable commitments of resources relative to tax revenue from the Proposed Action.</p> <p><b>Cumulative Impacts:</b> There are no cumulative impacts associated with the Proposed Action.</p>
15. DEMAND FOR GOVERNMENT SERVICES:
<p><b>Applicant's Proposed Action:</b> <b>Applicant's Proposed Action:</b> The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.</p> <p><b>Existing Environment:</b> The Nuss-Rock pit currently operates under conditions stipulated in the 2004 supplemental environmental assessment (DEQ 2004). The primary demands on governmental services for the pit are related to use of county and state highways.</p> <p><b>Potential Impacts:</b> Although the Proposed Action would expand the total area to be mined, the rate of gravel extraction would remain unchanged. Therefore, the Nuss-Rock pit would continue to</p>

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

generate approximately the same amount of truck traffic associated with the existing gravel operation. Please see Section 11: Human Health and Safety for a discussion of impacts due to traffic. No additional government services are anticipated as a result of this Proposed Action.

**Irreversible and Irretrievable Commitments of Resources:** The Proposed Action would not result in any irreversible or irretrievable commitments of resources related to government services.

**Cumulative Impacts:** The Proposed Action would not contribute to the need for local government services.

### 16. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

**Applicant's Proposed Action:** The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.

**Existing Environment:** The land being proposed for mining is un-zoned. Zoning compliance has been obtained from the Gallatin County Planning Department (Vaushan 2007). Gallatin County Commissioners ruled against imposing site-specific zoning at their November 2007 meeting. Such zoning would have prevented the Nuss-Rock pit and at least two other pits proposed in Gallatin County from going forward (Tucker 2007). However, at the May 7, 2008 meeting, the Gallatin County Commission voted to enact interim zoning covering all unincorporated and undeveloped areas of Gallatin County (Sullivan 2008). The county subsequently revoked TMC's zoning compliance form. The interim zoning requires all gravel pit owners to obtain conditional use permits prior to commencing operation. The interim zoning will be in effect for one year, and will require applicants to submit a \$4,000 fee for processing of their conditional use permit. TMC, Inc. is applying to the county for a conditional use permit for the Nuss and Storey amendments, and the Morgan Family application. The County CUP and State's MEPA processes are advancing concurrently.

**Potential Impacts:** TMC, Inc. acquired its zoning compliance prior to the May 2008 Gallatin County Commission meeting. It is unclear how the progress of the Nuss-Rock pit permit application may be affected or tied with the new interim zoning.

**Irreversible and Irretrievable Commitments of Resources:** The Proposed Action would not result in any irreversible or irretrievable commitments of resources related to county planning. Although the lands would be converted temporarily to an industrial use, because they are not currently zoned, they do not fall under any specific county plan.

**Cumulative Impacts:** The number of gravel pit permits pending before DEQ initiated the current discussions of county-wide and specific-use zoning within Gallatin County. The operation of the Nuss-Rock pit may contribute to the overall direction and scope of planning within Gallatin County.



<b>IMPACTS ON THE PHYSICAL ENVIRONMENT</b>	
<b>RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES</b>	
<b>17. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:</b>	
<p><b>Applicants Proposed Action:</b> The Proposed Action does not address any recreational potential within the tract. The current and proposed uses of the lands are agriculture and industrial, respectively. There are no wilderness areas in the general vicinity of the proposed project.</p> <p><b>Existing Environment:</b> Cottontail Road, the primary access point for the Nuss-Rock pit connects to US 191. As described in Section 11, gravel trucks currently used US 191 as part of their route to and from the Nuss-Rock pit. US 191 is the primary route from the Four Corners area south to Big Sky, the Gallatin National Forest, and Yellowstone National Park. There are numerous access points to National Forest Lands, campgrounds, and other recreational areas off US 191 south of the proposed permit area. There is no recreational potential within this tract.</p> <p><b>Potential Impacts:</b> Other than a slight increase in truck traffic during operation of the pit, there should be no effect on people using the highway to access recreational areas in the Gallatin Valley or to the south in Gallatin Canyon.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> The Proposed Action would not result in any irreversible or irretrievable commitments of recreational resources or impinge upon access to those resources.</p> <p><b>Cumulative Impacts:</b> None</p>	
<b>18. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:</b>	
<p><b>Applicant's Proposed Action:</b> Mining would eventually encompass the area in Tract 2C-4. The plan of operations includes removing the existing home in that tract.</p> <p><b>Existing Environment:</b> One single-family home exists, and is currently occupied on Tract 2C-4. The area surrounding the Nuss-Rock pit includes several homes on larger lots and acreages.</p> <p><b>Potential Impacts:</b> The plan of operations states that the home would be razed and not replaced.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> Although, the site owner's home would be lost, the loss does not constitute an irreversible or irretrievable commitment of housing resources. It is possible that the lands surrounding the proposed ponds would be developed as homesites after reclamation is completed.</p> <p><b>Cumulative Impacts:</b> None</p>	
<b>19. SOCIAL STRUCTURES AND MORES:</b>	
<p><b>Applicant's Proposed Action:</b> The Proposed Action does not address any social structures or mores. The current and proposed uses of the lands are agriculture and industrial, respectively.</p>	

IMPACTS ON THE PHYSICAL ENVIRONMENT
RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES
<p><b>Existing Environment:</b> The project area is situated within an area that is currently known for its rural residential and agricultural activities; however, the character of the area in and around Gallatin Gateway is under increasing development pressure. The existing surface mining activities are evident and cover approximately one-half of the total lands</p> <p><b>Potential Impacts:</b> Development of the Nuss-Rock Pit would impact the existing rural/agricultural setting by increasing a non-traditional industrial/surface mining operation. A change in the intensity of land use with heavy equipment, increased road traffic, noise, and dust, would adversely impact the rural/agricultural scene of the area. These impacts would occur throughout the life of the project, but would cease with the completion of gravel mining operations.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> None.</p> <p><b>Cumulative Impacts:</b> None.</p>
20. CULTURAL UNIQUENESS AND DIVERSITY:
<p><b>Applicant's Proposed Action:</b> The Proposed Action does not address any aspects of existing cultural diversity.</p> <p><b>Existing Environment:</b> The current and proposed uses of the lands are agriculture and industrial, respectively.</p> <p><b>Potential Impacts:</b> The Proposed Action would not result in a shift to any unique quality of the area.</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> The Proposed Action would not result in any irreversible or irretrievable commitments of resources related to the areas cultural diversity.</p> <p><b>Cumulative Impacts:</b> None</p>
21. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:
<p><b>Applicant's Proposed Action:</b> The Proposed Action would convert approximately 45.8 acres of agricultural, open lands to an industrial use. If granted, this amendment would increase the total area of the Nuss-Rock pit to 87 acres. After reclamation, the edges of the permit area would be graded, and two large ponds totaling 52.4 acres would remain.</p> <p><b>Existing Environment:</b> The current and proposed uses of the lands are agriculture and industrial, respectively. The project area is surrounded by open lands and scattered homesites on larger tracts.</p> <p><b>Potential Impacts:</b> Under the Opencut Mining Act DEQ has no authority or jurisdiction over property value issues. The Legislature has specifically limited DEQ's authority to issues relating to taxable value. Under Montana law, an administrative agency, such as DEQ, has only those</p>

## IMPACTS ON THE PHYSICAL ENVIRONMENT

### RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES

powers granted to it by the Legislature through enactment of statutes. The Legislature has given DEQ two means of mitigating the effects of gravel operations on adjacent property. First, DEQ has authority to protect air quality; to minimize noise and visual impacts to the degree practicable through use of berms, vegetation screens, and limits on hours of operation; and to otherwise prevent significant physical harm to adjacent land. Second, in order to protect and perpetuate the taxable value of property, land on which operations are completed must be graded and revegetated or reclaimed to a locally approved land use.

In 1998, DEQ hired Mr. Philip Rygg, Member of the Appraisal Institute, to conduct a study on the effect of two open pit gravel mining operations near Bigfork, Montana on neighborhood property values. The purpose of the study was to assess if there was a measurable adverse effect on the property values within a one half mile radius of the active gravel pits. The following restrictions applied: neighborhood water quality and quantity would be protected; pit operations were limited to a gravel crusher, wash plant, cement batch mill, and pug mill; hours of operation were restricted to 6 A.M. to 7 P.M. Monday through Saturday; size of open mining area was not to exceed 33.7 acres; fueling areas were lined and bermed to contain spills; and reclamation would be completed by 2008.

Rygg employed a sales comparison technique to compare actual sales values of six properties adjacent to, or within 1/8 mile, of the gravel pits (subject sales), to comparable sales of 25 similar properties (in the Flathead Valley in economically similar neighborhoods with physically similar improvements) located outside the influence of the gravel pits (comp sales). The subject properties were influenced by noise, dust, traffic, fumes and/or views of the pits; all sales occurred while gravel pits were active. If there was a difference between the price of the influenced property and the price of the uninfluenced property that could not be attributable to other causes (e.g. size, age, land value or physical condition), the difference may be attributable to economic depreciation caused by the gravel pits.

Rygg concluded that, assuming continuation of the same level of gravel pit activity as in 1994-1996 (in 1997 there was a peak level of gravel pit activity), the presence of the gravel pits had not adversely affected the value of the subject properties, and therefore would not adversely affect the other properties in the neighborhood. Rygg stated that *“a continuation of this peak level of operation [1997 level] could eventually erode neighborhood property values, although existing market evidence is insufficient to validate such a hypothesis”*.

Rygg's analysis was reviewed by Jim Fairbanks, Region 3 Manager of the Property Assessment Division of the Montana Department of Revenue (Fairbanks 1998). Fairbanks concluded that Rygg's approach was valid, and stated that in his experience with arguments of Missoula County taxpayers asserting negative property value impacts from gravel pits, power lines, traffic etc.; there were no measurable impacts in virtually all cases. He stated that *“potential purchasers accept newly created minor nuisances that long-time residents consider value diminishing.”* (Fairbanks 1998).

Based on Rygg's analysis and Fairbanks' review, sale or market value of adjacent property has not been shown to be negatively affected by the presence of a gravel pit and associated operations.

Mr. Orville Bach presented comments to the Gallatin County Commission regarding gravel pits near Cameron Bridge Road, and makes the argument that there most likely will be negative effects

<b>IMPACTS ON THE PHYSICAL ENVIRONMENT</b>	
<b>RESOURCES, POTENTIAL IMPACTS AND MITIGATION MEASURES</b>	
<p>on property values (Bach 2008). Mr. Bach taught college level economics for 33 years and is a Gallatin County Resident. In his comments he states there is excellent economic research available that provides data on economic damage resulting from gravel pit operations, and he includes nine citations to support this statement. He includes a figure from one of the citations showing the impact on residential property values based on distance of the property from the gravel mine – the closer the property, the greater the impact. Based on this figure, properties less than a quarter mile from the mine experienced up to a 32% decline in value. The impact on property value declined with increased distance from the gravel mine. Properties three miles away (the furthest distance in the analysis) experienced a 5% decline. Mr. Bach points out that declining property values could eventually translate into decreased property tax revenue for the County and that this decreased revenue may not be offset by property taxes paid by the gravel operation.</p> <p>If homeowners believe their property values are decreased because of a gravel operation, they may appeal to the County and the State for tax adjustment. Impact-mitigating restrictions such as hours of operations, dust control, water testing and visual berms on operations of this nature have been successful elsewhere in the state. Formal tax appeals have not generated a reduction in taxable values of land affected by aggregate mining. In responding to valuation challenges of ad valorem tax appraisals, Montana Department of Revenue did not find measurable negative impacts to property values due to gravel pits and other “nuisances” (Fairbanks 1998)</p> <p><b>Irreversible and Irretrievable Commitments of Resources:</b> The Proposed Action would not result in any irreversible or irretrievable commitments of resources related to the area’s social and economic circumstances.</p> <p><b>Cumulative Impacts:</b> Development of the Nuss-Rock Pit amendment would contribute to the overall development progression in Gallatin Valley. However, the change in land use on this parcel is temporary, and does not constitute a significant contribution to cumulative impacts to social and economic circumstances in the county.</p>	

**22. Public Involvement, Agencies, Groups or Individuals contacted:**

- Gallatin County Planning Department
- Gallatin County Weed Control Board
- Montana State Historical Preservation Office
- Montana Department of Transportation
- Resident notification letters sent to landowners within 1,000 feet of permit area
- Gallatin County Health Department
- Montana Natural Heritage Program

**23. Other Governmental Agencies with Jurisdiction, List of Permits Needed:**

Agency	Permit
Montana Department of Natural Resources and Conservation	Water rights conversion
Air Resources Management Bureau of the MT Department of Environmental Quality	Air quality permit
Gallatin County Weed Board	Weed control plan
Gallatin County Planning Office	Zoning clearance

Montana Department of Transportation	
Montana Department of Environmental Quality	Temporary Discharge Permit

**24. Magnitude and Significance of Potential Impacts:** The potential impacts related to the general environment are not likely to be significant based on the lack of sensitive or critical vegetation, wildlife or their habitats. Water usage for the proposed operation would not result in any decrease of available water supply to the Gallatin Valley as the quantity of the water right would not change. In addition, water would be recycled on site. There are no identified water quality impacts that have the potential to adversely impact human health and safety. The Plan of Operations includes measures such locating soil berms along some of the site boundaries and placing the crusher on the floor of the pit to reduce noise, visual, and light impacts. DEQ would also enforce state and federal air guidelines and standards to ensure the protection of human health and welfare.

**25. Regulatory Impact on Private Property:** The Private Property Assessment Act requires the Department to analyze whether or not the department's decision would constitute a "taking" of the landowner's or operator's property rights. The Private Property Assessment Act Checklist, attached below, would be completed when the permitting decision is made.

**26. References:**

Bach, O. March 26, 2008. Comments to the Gallatin County Commission regarding proposed gravel pits near Cameron Bridge Road.

Big Sky Acoustics (BSA). 2008. Helena Sand & Gravel Lake Helena-Valley Drive Gravel Pit Environmental Noise Study. Prepared for Helena Sand & Gravel, Helena, Montana. Dated February 29, 2008.

Fairbanks, Jim; Region 3 Manager, Property Assessment Division, Montana Department of Revenue. April 6, 1998. Letter to Randy Wilke, Acting Administrator, Property Assessment Division, Department of Revenue, Helena Montana re: Review of report entitled "Gravel Pits: The Effect on Neighborhood Property Values".

Federal Transit Administration (FTA). 1995. Transit Noise and Vibration Impact Assessment, Final Report. April 1995. U.S. Department of Transportation. DOT-T-95-16.

Gallatin County Commission (GCC). 2008. Proposed "good neighbor" provisions for gravel pits. February 15, 2008. Bozeman, Montana.

Hackett, O.M., and others. 1960. Geology and Ground-water Resources of the Gallatin Valley, Gallatin County, Montana. U.S. Geological Survey Water-supply Paper 1482.

Harris, C., ed. 1998. Handbook of Acoustical Measurements and Noise Control. Acoustical Society of America, Woodbury, New York.

International Organization for Standardization (ISO). 1996. Standard 9613-2, *Attenuation of Sound during Propagation Outdoors, Part 2: General Method of Calculation*.

Kenai Engineering, Inc. 2007. Letter to Jerry Rice, TMC, Inc. Dated August 17, 2007. RE: Amount of topsoil at Nuss gravel pit. Kenai Engineering, Gallatin Gateway, Montana.

Montana Department of Environmental Quality.  
<http://www.deq.state.mt.us/AirQuality/Planning/AirNonattainment.asp>

Montana Department of Environmental Quality.  
[http://www.deq.state.mt.us/AirQuality/WhatsNew/BJ\\_Gallatin\\_General\\_Talk.pdf](http://www.deq.state.mt.us/AirQuality/WhatsNew/BJ_Gallatin_General_Talk.pdf)

Montana Department of Environmental Quality (DEQ). 1998. Final environmental assessment, Permit TMC-002, TMC, Inc. Nuss Pit. Industrial and Energy Minerals Bureau. Helena, Montana.

Montana Department of Environmental Quality (DEQ). 2003. Cook Lehrkind Gravel Mining Project Final Environmental Assessment (EA) and Application Decision. Industrial and Energy Minerals Bureau, Helena, Montana.

Montana Department of Environmental Quality (DEQ). 2004. Final supplemental environmental assessment, Permit TMC-002, TMC, Inc. Nuss Pit amendment. Industrial and Energy Minerals Bureau. Helena, Montana.

Montana Department of Transportation (MDT). 2001. Traffic Noise Analysis and Abatement: Policy and Procedure Manual, June 2001.

Montana Natural Heritage Program (MNHP). 2008. Threatened, endangered, and sensitive species data request result for Nuss-Rock Pit, LLC amendment site with 5 mile radius. Dated March 14, 2008. Montana State Library, Helena.

Morrison Maierle, Inc. 2008. Traffic assessment for the Morgan Family, LLC gravel pit. Gallatin Gateway, Montana. February 2008. Prepared for: TMC, Inc. Belgrade, Montana.

Nicklin Earth & Water Inc. 2007. Hydrologic Study, Rock Pit-TMC Gravel Pit. Prepared for Rock Pit, LLC.

Rice, J. 2008. Manager TMC, Inc. Personal communication during site visit on March 10, 2008.

Soil Survey Geographic Data (SSURGO). Data accessed at <http://maps2.nris.mt.gov/mapper/> on May 4, 2008.

- Sullivan, G. 2008. Resolution 2008-053: Resolution adopting the Gallatin County interim zoning district, regulation and map regulation operations that mine sand and gravel and operations that mix concrete or batch asphalt. Dated May 7<sup>th</sup>, 2008. Gallatin County Commission, Bozeman, Montana.
- Threeway Mining Company, Incorporated (TMC, Inc.). 2007a. Amendment application for the Nuss-RockPit. Dated July 7, 2007. TMC, Inc. Belgrade, Montana.
- Threeway Mining Company, Incorporated (TMC, Inc.). 2007b. Drawings and surveyed depths of existing pond at Nuss-RockPit. Letter to Jo Stephen, dated March 26, 2007. TMC, Inc. Belgrade, Montana.
- Tucker, M. 2007. County refuses to zone gravel pits. Belgrade News, November 23, 2007.
- U.S. Environmental Protection Agency (EPA). 1971. Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances. December 31, 1971. NTID 300.1.
- U.S. Environmental Protection Agency (EPA). 1979. Protective Noise Levels, Condensed Version of EPA Levels Document. EPA 550/9-79-100 (N-96-01 II-A-86).
- U.S. Mine Safety and Health Administration (MSHA). 2008. Horns, Back-up Alarms, and Automatic Warning Devices.  
<http://www.msha.gov/stats/top20viols/tips/14132.htm>. Webpage viewed on February 6, 2008.
- Vaughn, M. 2008. Personal communication on June 2, 2008. Fisheries biologist. Montana Fish, Wildlife and Parks, Bozeman.
- Vaushan, W. 2007. Zoning compliance for TMC, Inc. pit on property owned by Nuss-Rock Pit LLC in NE ¼ of Section 9 and NW ¼ of Section 10, T3S, R4E. Zoning Compliance Form from Opencut Mining Program. Dated July 5, 2007.
- Vuke, S.M., J.D.Lonn, R.B. Berg, and K.S. Kellogg. 2002. Preliminary Geologic Map of the Bozeman 30' x 60' Quadrangle, Southwestern Montana. Montana Bureau of Mines and Geology Open File Report MBMG 469.

**27. Recommendation for Further Environmental Analysis:**

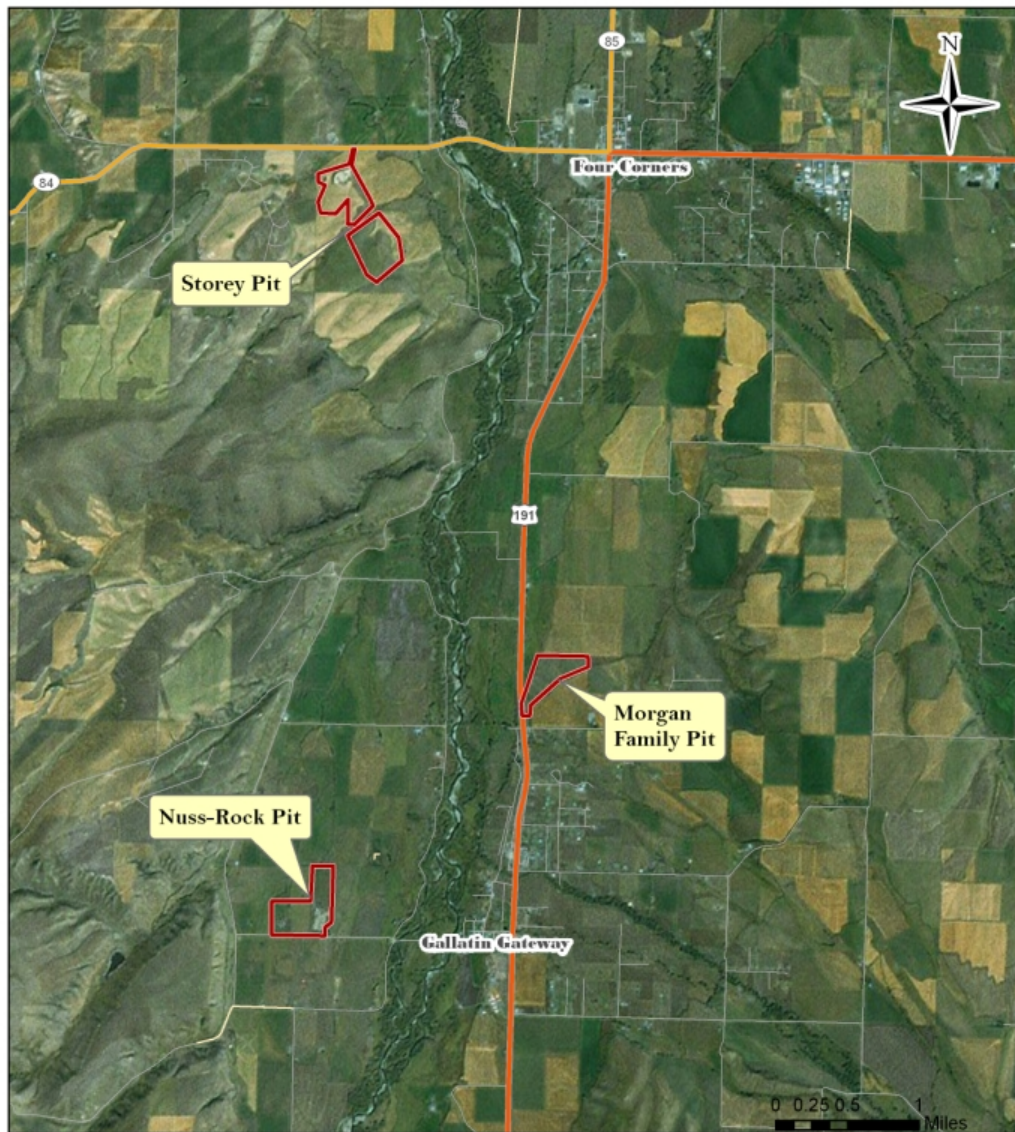
☐ EIS      ☐ More Detailed EA      ☐ No Further Analysis

**28. EA Prepared By:** Garcia and Associates, Third party Contractor  
Jo Stephen                      Opencut Mining Program Environmental Specialist  
Name                              Title

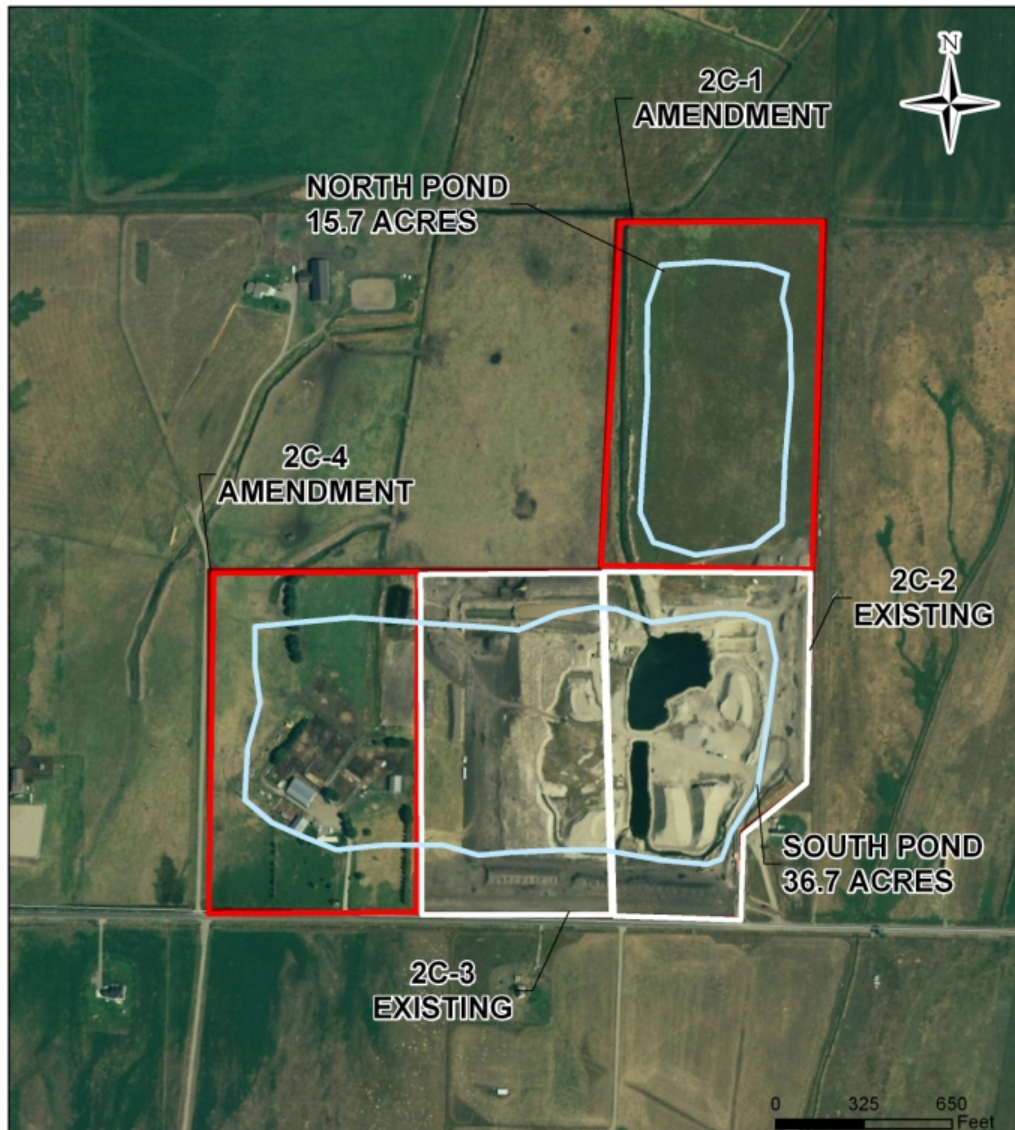
**29. EA Reviewed By:** Tom Ellerhoff                      Environmental Program Manager



## PROJECT MAPS







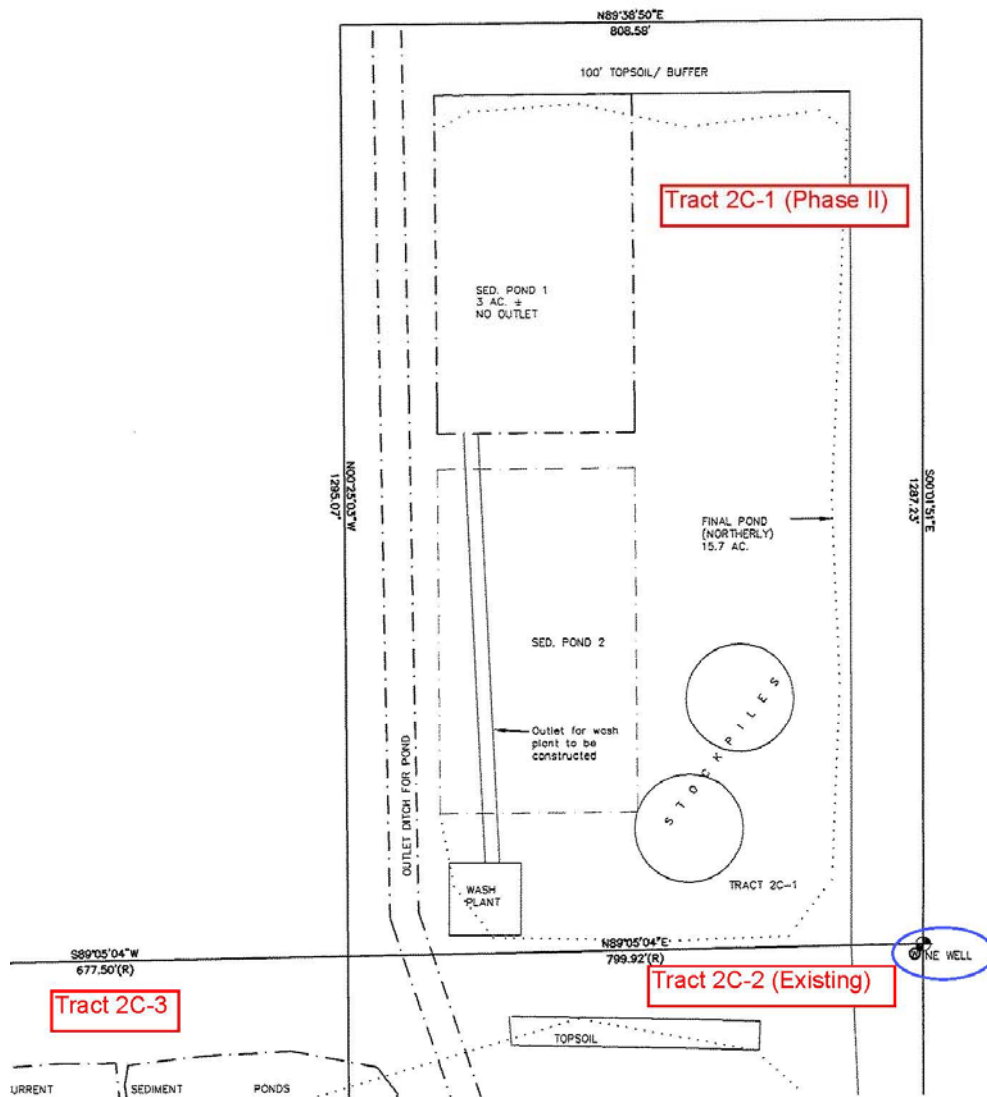


Figure 3. Points of reference for Tract 2C-1 and Tract 2C-2 of the Nuss-Rock pit near Gallatin Gateway, Montana.

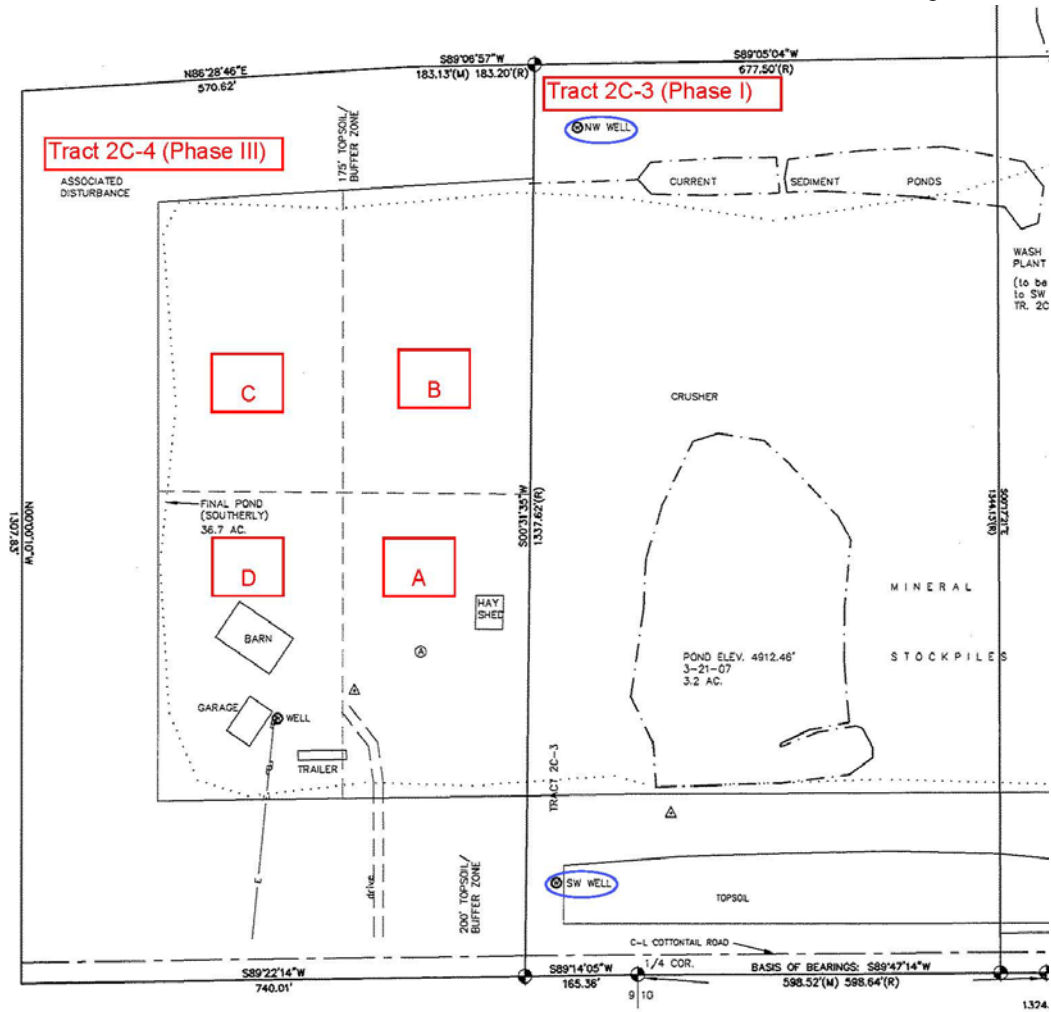


Figure 4. Points of reference for Tracts 2C-3 and 2C-4 of the Nuss-Rock Pit near Gallatin Gateway, Montana.



Figure 5. Ambient noise measurement locations near the Nuss-Rock pit near Gallatin Gateway, Montana.

**APPENDICES**  
**APPENDIX A: Water Resources Information for the Nuss-Rock Pit.**

**Table A.1: Groundwater Elevations at the TMC Nuss-Rock Pit**

<b>DATE</b>	<b>SE (trailer)</b>	<b>SW</b>	<b>NW</b>	<b>NE</b>
12/6/2004	-	4920.06	4914.22	4909.47
1/3/2005	4913.80	4919.48	4913.83	4909.24
2/1/2005	4913.55	4919.15	4913.51	4909.08
3/1/2005	4913.72	4919.10	4913.56	4909.07
4/2/2005	4913.72	4919.06	4913.48	4908.94
5/4/2005	4913.82	4919.61	4913.93	4909.27
5/25/2005	4914.80	4920.86	4914.58	4909.97
7/1/2005	4915.30	4922.88	4915.86	4910.47
8/2/2005	4915.88	4924.12	4916.58	4911.05
9/2/2005	4915.97	4923.18	4916.40	4911.87
10/5/2005	4915.45	4921.31	4915.08	4910.85
10/31/2005	4914.42	4920.78	4914.87	4909.82
12/1/2005	4914.05	4919.76	4914.01	4909.45
1/4/2006	4913.80	4919.14	4913.56	4909.24
1/30/2006	4913.88	4919.03	4913.52	4909.07
2/28/2006	4913.35	4916.97	4912.44	4908.90
4/3/2006	4913.15	4916.88	4912.33	4908.65
5/1/2006	4913.28	4916.26	4911.98	4908.73
6/1/2006	4914.07	4917.82	4913.03	4909.37
7/5/2006	4914.67	4919.03	4913.64	4909.99
8/7/2006	4914.72	4919.06	4913.73	4909.90
9/1/2006	4914.55	4918.45	4913.33	4909.72
10/4/2006	4914.42	4917.98	4912.33	4909.72
10/31/2006	4914.33	4917.63	4912.87	4909.56
12/1/2006	4913.11	4916.63	4912.21	4909.02
1/2/2007	4913.24	4916.18	4911.88	4908.70
1/31/2007	4913.03	4916.07	4911.73	4908.52
3/5/2007	4913.22	4916.09		4908.59
4/5/2007	4913.24	4916.13	4911.83	4908.61
5/1/2007	4913.54	4916.37	4911.98	4908.79
5/30/2007	4915.22	4918.21	4913.57	4911.07
7/2/2007	4915.14	4918.74	4913.75	4910.97
8/1/2007	4917.46	4917.79	4912.87	4909.91
8/13/2007	4914.36	4917.50	4912.71	4909.63
9/3/2007	4914.50	4917.08	4912.48	4909.73
10/1/2007	4914.51	4916.72	4912.28	4910.07

**Table A.1: Groundwater Elevations at the TMC Nuss-Rock Pit**

DATE	SE (trailer)	SW	NW	NE
10/17/2007	-	4916.34	4911.98	4909.07
10/22/2007	4913.65	4916.34		
10/31/2007	4913.46	4916.22	4911.84	4909.24
11/29/2007	4912.51	4915.82	4911.49	4908.53
12/31/2007	4912.99	4915.55	4911.26	4908.27
1/31/2008	4911.95	4915.28	4911.03	4908.10
2/28/2008	4912.75	4915.28	4911.05	4908.07
4/1/2008	4912.80	4915.48	4911.48	4908.17

**Table A-2: Nuss-RockGravel Pit Water Quality as Measured at Monitoring Wells and Pond Outlet**

		Well #1 (SE)		Well #2 (SW)		Well #3 (NW)		Well #4 (NE)		Pond Outlet
		1	2	1	2	1	2	1	2	1
Sampling Event										
<b>PHYSICAL PROPERTIES</b>	Units									
pH	s.u.	7.6	7.4	7.6	7.4	-	7.4	7.7	7.9	-
Conductivity	umhos/cm	286	343	252	395	-	405	337	151	-
Total Dissolved Solids	mg/L	141	198	139	214	-	217	197	60	195
<b>INORGANICS</b>										
Alkalinity (CaCO <sub>3</sub> )	mg/L	90	135	83	130	-	130	114	73	-
Bicarbonate (HCO <sub>3</sub> )	mg/L	110	165	101	158	-	158	139	89	-
Carbonate (CO <sub>3</sub> )	mg/L	ND	ND	ND	ND	-	ND	ND	ND	-
Chloride	mg/L	2	2	2	21	-	28	2	2	-
Sulfate	mg/L	39	34	34	31	-	28	42	ND	-
Hardness as CaCO <sub>3</sub>	mg/L	131	162	112	161	-	148	161	64	-
A/C Balance Sigma		1.65	0.31	-0.56	0.96	-	0.27	-1.50	0.09	-
<b>NUTRIENTS</b>										
Nitrogen (nitrate+nitrite)	mg/L	ND	0.40	ND	0.19	-	0.30	0.22	ND	-
<b>METALS, TOTAL</b>										
Calcium	mg/L	32	45	26	43	-	38	45	10	-
Magnesium	mg/L	13	12	11	13	-	13	12	9	-
Potassium	mg/L	3	2	3	3	-	3	2	2	-
Sodium	mg/L	5	4	4	17	-	21	4	4	-
<b>EXTRACTABLE PETROLEUM HYDROCARBONS - SCREEN</b>										
Total EPH	mg/L	ND	ND	ND	ND	-	ND	ND	ND	ND
<b>COLIFORM</b>										
Coliform, total	Per 100ml		A			-	A		A 9/4	-

Note: Sampling event #1 occurred on 5/25/05 and sampling event #2 took place on 8/13/2007  
A= Absent ND = Non Detect

**Table A-3: TMC/ Nuss-Rock Gravel Pit**  
**AUGUST 13, 2007 - WATER TEMPERATURES**

<u>Westerly Pond</u>		<u>Easterly Pond</u> South of culverts		<u>Easterly Pond</u> North of culverts	
Depth (ft)	Temp. (deg. F.)	Depth (ft)	Temp. (deg. F.)	Depth (ft)	Temp. (deg. F.)
1.0	52.5	1.0	49.0	1.0	51.5
2.0	51.0	2.0	49.0	2.0	51.0
3.0	50.8	3.0	49.0	3.0	50.5
4.0	50.5	4.0	49.0	4.0	50.1
5.0	49.8	5.0	48.8	5.0	49.8
10.0	49.2	8.3	48.5	6.3	49.8
15.0	48.8	Total depth = 8.4'		Total depth = 6.4'	
20.0	48.2				
25.0	48.0				
30.0	47.8				
35.0	47.8				
40.0	47.6				
Total depth = 40.4'					

<u>Outlet to Pond</u>		<u>Wells</u>	
Depth (ft)	Temp. (deg. F.)	Wells	Temp. (deg. F.)
1.0	49.5	SW	45.5
		SE	53.0
		NW	49.0
		NE	52.5

Notes: At the time of sampling the crusher and wash plant were running and an excavator was digging inside of the dyke in the westerly pond. The air temperature was 75 degrees F., wind south then north at 5 mph, sunny and smokey. Work was done between 8:50 a.m and 1:32 p.m. on August 13 2007. Water samples were taken and sent to the lab.

## Private Property Assessment Act Checklist

**PROPERTY DESCRIPTION:** The Nuss-Rock Pit includes the NE¼ of Section 9 and the NW¼ of Section 10, Township 3 South, Range 4 East.

**COMPANY NAME:** Nuss-Rock Pit, LLC

**DATE:**

**PREPARED BY:**

### DOES THE PROPOSED AGENCY ACTION HAVE TAKINGS IMPLICATIONS UNDER THE PRIVATE ASSESSMENT ACT?

YES	NO	
		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
		2. Does the action result in either a permanent or indefinite physical occupation of private property?
		3. Does the action deprive the owner of all economically viable uses of the property?
		4. Does the action deny a fundamental attribute of ownership?
		5. Does the action require a property owner to dedicate a portion of property or to grant an easement? (If answer is NO, skip questions 5a and 5b and continue with question 6.)
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
		6. Does the action have a severe impact on the value of the property?
		7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally? (If the answer is NO, skip questions 7a-7c)
		7a. Is the impact of government action direct, peculiar, and significant?
		7b. Has the government action resulted in the property becoming practically inaccessible, waterlogged, or flooded?
		7c. Has the government action diminished property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?

*Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b.*

*If taking or damaging implications exist, the agency must comply with § 5 of the Private Property Assessment Act, to include the preparation of a taking or damaging impact assessment. Normally, the preparation of an impact assessment will require consultation with agency legal staff.*